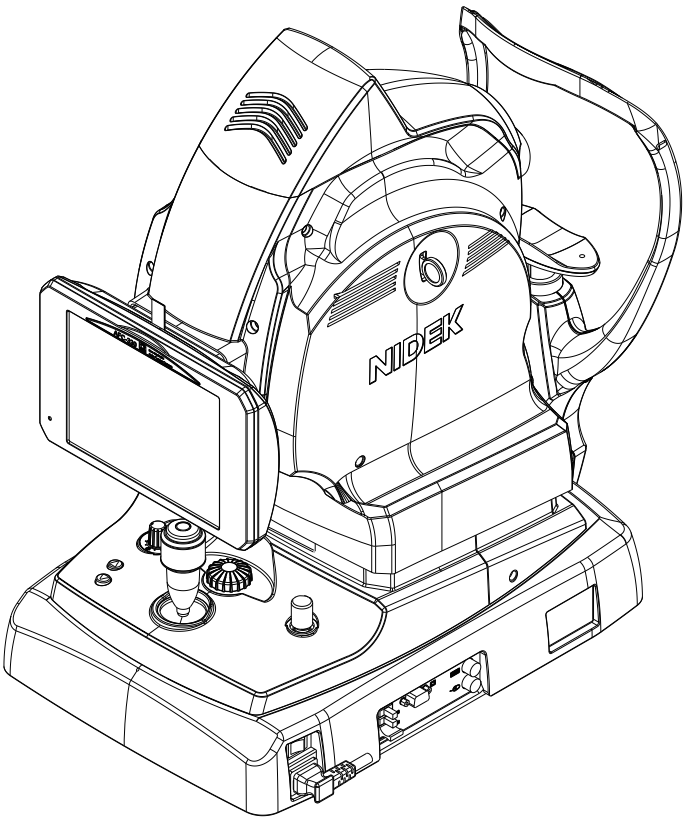
NIDEK

NON-MYDRIATIC AUTO FUNDUS CAMERA

AFC-330

OPERATOR'S MANUAL



Original instructions

Eye & Health Care
NIDEK CO., LTD.

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Use this device properly and safely.

⚠ **BEFORE USE, READ THIS MANUAL.**

This operator's manual includes operating procedures, safety precautions, and specifications for the NIDEK Non-mydriatic auto fundus camera, AFC-330.

Cautions for safety and operating procedures must be thoroughly understood before using this device.

Keep this manual handy for reference.

Use of the device outside the scope of this manual may cause unanticipated adverse events or adverse device effects.

There are no parts within the device that requires servicing by the user.

If you encounter any problems or have questions about the device, please contact NIDEK or your authorized distributor.

Safety precautions

In this manual, a signal word is used to designate the degree or level of safety alerting. The definition is as follows:

⚠ **WARNING** • Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

⚠ **CAUTION** • Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage accident.

Even situations indicated by "⚠ CAUTION" may result in serious injury under certain conditions. Safety precautions must be strictly followed at all times.

Usage precautions

Safety of LED

⚠ **CAUTION** • **The device is a Class 1 LED product in accordance with IEC60825-1: 1993+A1: 1997+A2: 2001 and the LED used for the device is safe in expected use conditions including situations such as looking into the LED using an optical system. However, it is recommended to observe the following precautions when using the device:**

1)Do not direct LED beams to human eyes when unnecessary.
2)Do not look into the objective lens (aperture) for a long period of time for observation.
3)If the device cannot be used properly or any device problem cannot be solved, immediately stop using the device, then contact NIDEK or your authorized distributor.

Before Use

⚠ **WARNING** • **Be sure to use a grounded power outlet.**

Electric shock or fire may result in the event of malfunction or power leakage.

⚠ **CAUTION** • **Never use the device for other than its intended purpose.**

NIDEK will not assume responsibility for accidents or malfunction caused by misuse.

- **Before use of the device, read this manual. Especially, the cautions for safety and operating procedures must be thoroughly understood. Do not use accessories that are not specified by NIDEK for the device.**

 Use of the device outside the scope of the specified use may result in unexpected troubles and adverse events.

- **Never modify or touch the internal structure of the device.**

 Electric shock or malfunction may result.

- **When unpacking the device, secure a sufficient space.**

 When the outer box is lifted to be moved, it may hit the wall, ceiling, or objects around.

- **Install and use the device under the following conditions:**

 Ambient temperature: 10 to 35ºC (50 to 95ºF)
 Humidity: 30 to 90% (Non-condensing)
 Atmospheric pressure: 800 to 1,060 hPa
 Protected from exposure to water
 Minimal dust in the air
 Protected from extraneous light sources
 Level and stable surface free from vibration and bumping
 The room can be darkened to the degree that a newspaper can barely be read

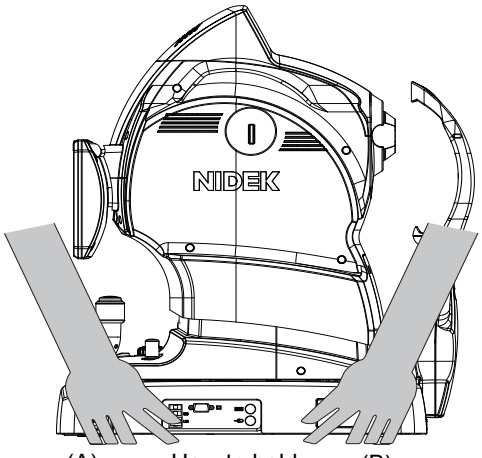
 The reliability of image capture results is lowered, and malfunction may result. In addition, injury may result if the device is bumped or topples over.

- **Do not install the device where it is exposed to strong electromagnetic waves during operation.**

 Images may not be captured properly, or malfunction may result.

⚠ **CAUTION**

- **Install the device in an environment where no contaminant such as corrosive gas, acid, or salt is contained in the air.**
 Corrosion or malfunction of the device may result.
- **Avoid installing the device where it is exposed to direct air flow from an air conditioner.**
 Changes in temperature may result in condensation inside the device or adversely affect image capture results.
- **Be sure to use a power outlet which meets the specified power requirements.**
 If the supplied voltage is too high or low, the device may not perform up to specifications, and malfunction or fire may result.
- **Never use power strips or extension cables for the power supply of the device.**
 Overloading the electric outlet may cause overheating and fire.
- **Insert the power cord plug fully into the power outlet.**
 Imperfect connection may result in fire.
- **Do not use any power cord other than the one provided. Do not use the provided power cord for any other instrument.**
 Malfunction or fire may result.
- **Before connecting any cables to the device, be sure to turn off power to the device and unplug the power cord.**
 Malfunction may result.
- **Never crush or pinch the power cord with heavy objects.**
 Damage may result in electric shock or fire.
- **Be sure to securely connect cables to specific connectors without applying excessive force (with their port shapes matching the plug shape).**
 Failure may result.
- **Do not connect anything other than the optional external fixation lamp unit to the external fixation lamp connector.**
 Failure, electric shock, or fire may result.
- **When carrying the device to another location, its base should be held by two hands from both sides by two persons as indicated by (A) and (B) in the figure shown to the right. Never hold any parts other than the base such as the forehead rest, chinrest, joystick, or image capturing unit.**
 If any parts other than the base are held, the device may fall and injury or failure may result.



(A) How to hold (B)

⚠ **CAUTION**

- **Before carrying the device to another location, disconnect all the cords and cables.**
 If the cords and cables get caught or stepped on, the device may fall, resulting in injury or failure.
- **Do not expose the LCD touch-screen to direct sunlight or intense ultraviolet rays.**
 The LCD touch-screen may become damaged.
- **Before carrying the device to another location, set it to Packing mode and ready to be packed, and lock the main unit to the base with the main unit locking knob.**
 The main unit may move during the transport and the device may fail.
 For details of the locking knob, see “5. Locking knob” (Page 7) in “1.4 Device Configuration”.
 Do not lock the main unit to the base with the locking knob when transporting the device in the packing material. (For details of Packing mode, see “2.4.2 Finishing operation in order to transport the device: Packing mode” (Page 68).)
- **Perform visual and operational checks before using the device. Do not use the device if any error is found.**
 Use of a malfunctioning device will not produce the expected results and may cause troubles or lead to inappropriate diagnoses that may induce health hazards.

During Use

⚠ **CAUTION**

- **Be sure to use accessories specified by NIDEK.**
 Use of the accessories not specified by NIDEK may cause malfunctions or adverse events.

- **When turning off power to the device, do not turn off (◯) the power switch at first. Be sure to turn off the device power with the procedure described in "2.4.1 Usual finishing of operation" (Page 67).**
 If the power switch is turned off (◯) at first without observing the correct procedure, corruption of data or software, or failure of the device may result.

- **When restarting the device, turn on power to it at least three seconds after turning power off.**
 The device may malfunction.

- **Caution should be exercised when deciding to apply this device to treat a very young child or a patient with aphakic eye or ocular disease.**
 Risk of trouble increases

- **Prior to image capture, explain the purpose and method sufficiently to the patient.**

- **Set the amount of the light emitted from the device to the minimum level required. Be sure to return the light amount to the minimum level after every patient.**
 Large amount of light not only may cause dizziness but also may cause thermal or optical damage to the patient's retina.
 The light amount depends on the duration and intensity with which the light is radiated on the retina.

- **Take care not to catch hands or fingers in moving parts such as between the image capturing unit and the main unit, between the main unit and the base, and the chinrest.**
 Hands or fingers may be pinched and result in injury.

- **Take care not to let the image capturing unit contact the patient's face when moving it close to the patient's face.**
 Injury may result.

- **Be sure to pull the image capturing unit to toward the operator using the joystick before moving it to the other eye.**
 Injury may result.

- **Be sure to perform image capture with sufficient eye fixation and eyelid opening.**
 Eyelid, eyelashes, or insufficient eye fixation may interfere with capturing of proper images.

- **Make sure that the patient does not stand up while holding device parts such as the forehead rest after image capture.**
 The device may topple over.

⚠ **CAUTION**

- **Before and after use, and before every patient, clean the parts that come into contact with the patient such as the forehead rest and chinrest with clean gauze or cloth dampened with rubbing alcohol. For severe stains, wipe with a clean cloth dampened with rubbing alcohol instead of wiping them repeatedly with a dry cloth.**
 If the chinrest papers are used, remove a sheet after each patient.
- **If the periphery of the objective lens is contaminated by contact with the patient's eyelashes or exposure to their tears, clean the periphery with rubbing alcohol before the next patient.**
- **Before use, check that the objective lens is clean without dust, dirt, or fingerprints.**
 If the objective lens is not clean, the quality of captured images is substantially affected.
- **If the objective lens is not clean, be sure to clean it before the next patient. Do not use rubbing alcohol to clean the objective lens.**
 For cleaning of the objective lens, see "4.3 Cleaning Objective Lens" (Page 155).
- **In the event of smoke or strange odors, immediately turn off the device and disconnect the power plug from the outlet. Once it is determined that the smoke will not become more serious, contact NIDEK or your authorized distributor.**
 Continued use may result in electric shock or fire. In case of fire, use a dry chemical (ABC) extinguisher.
- **Immediately replace the power cord if the internal wires are exposed, the power turns on or off when the power cord is moved, or the cord or plug is too hot.**
 Immediately remove the plug from the power outlet and contact NIDEK or your authorized distributor for replacement. Failure to do so may result in electric shock or fire.
- **Do not operate the LCD touch-screen with wet hands.**
 If water enters inside the device, the device may fail.
- **There may be a few "constantly-lit", "missing" or "dead" pixels in the LCD touch-screen which are a characteristic of the LCD touch-screen manufacturing process. This does not represent a failure of the LCD touch-screen, and the monitor can be used with no problem.**
- **Never touch the LCD touch-screen with any hard pointed object such as a ball-point pen. Keep magnetic objects away from the LCD touch-screen.**
 The monitor may be damaged.
- **The base and image capturing units are equipped with a cooling fan for each. Fan noise does not indicate a failure of the device or interfere with operation of the device.**
- **If the device fails, disconnect the power cord from the power outlet, then contact NIDEK or your authorized distributor without touching the interior of the device.**
- **If the device is connected to a PC that does not comply with IEC60601-1 (except one that uses an AC adapter that meets the Class II requirements of IEC60950-1), supply power to the device and PC through isolation transformers.**
 Contact NIDEK or your authorized distributor for installing isolation transformers.

⚠ **CAUTION**

- **Each time before connecting a USB flash drive to the device, be sure to check it for viruses.**

 If the device is infected with a virus and any problem occurs, NIDEK does not assume responsibility or compensate for damages.

- **Users are responsible for managing captured image data.**

 NIDEK will not assume any responsibility for loss of data.

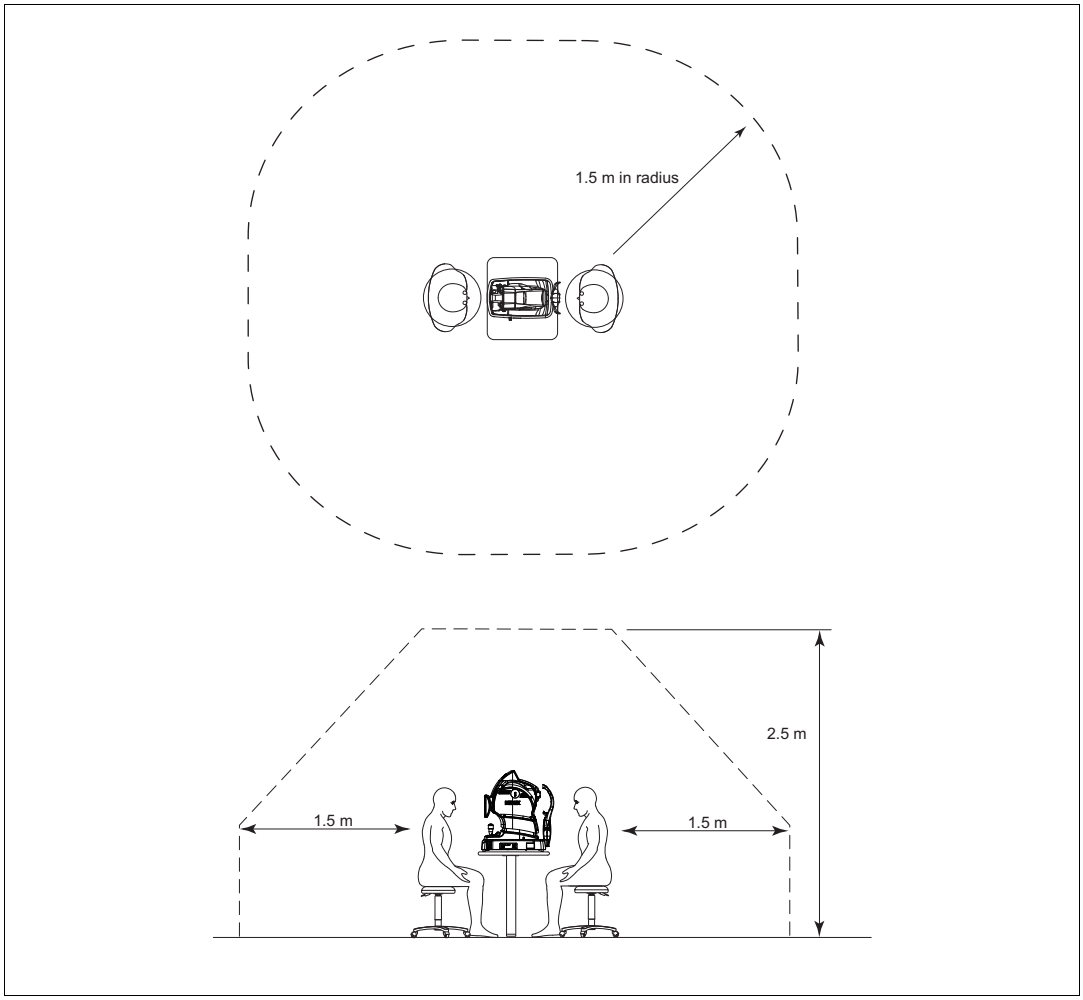
- **Equipment connected to the analog or digital interfaces must be certified according to the representative appropriate national standards (such as EN 60601-1 and IEC 60601-1). Further more, all configurations shall comply with the system standard IEC 60601-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1. If in doubt, consult the technical service department of your local representative.**

- **This device is classified as Group 1 according to "4.4 Optical radiation hazard with fundus cameras" in ISO 10940: 2009 Ophthalmic instruments—Fundus cameras, and conforms to the standard.**

Patient environment

The patient environment is the volume of space in which contact can occur between the patient and any part of the device or between the patient and any other person(s) touching the device.

Use devices that comply with IEC60601-1 in the patient environment. If any device that does not comply with IEC 60601-1 is to be used, use an isolation transformer or common protective grounding.



After use

⚠ **CAUTION**

- **When the device is not in use, turn off power to the device and protect the objective lens from dust by covering it with the lens cap, then place the dust cover over the unit.**
- **When disconnecting the power plug from the power outlet, turn off power to the device, then remove it making sure to always hold the power plug, not the cord.**

 The metal core of the cord may be damaged and electric shock, malfunction, or fire may result.
- **If the device will not be used for an extended period of time, disconnect the power cord from the power outlet.**

 Failure to do so may leave the device vulnerable to electric disturbances which may result in fire.
- **Occasionally clean the prongs of the power plug with a dry cloth.**

 If dust settles between the prongs, the dust could collect moisture, and short circuit or fire may occur.
- **If the device is used after a long period of disuse, check for any abnormality before use.**
- **Store and transport (when the device is packed) under the following conditions:**

 Ambient temperature during transport: -30 to 60ºC (-22 to 140ºF)
 Ambient temperature during storage: -10 to 55ºC (14 to 131ºF)
 Humidity: 10 to 95% (non-condensing)
 Atmospheric pressure: 700 to 1,060 hPa
 Protected from exposure to water
 Minimal dust in the air
 Protected from direct sunlight
- **When transporting the device, set it to Packing mode and ready to be packed, and store it in a specific packaging material without locking the main unit using the locking knob.**

 The device may fail from excessively hard vibration or bumping.

 For details of Packing mode, see “2.4.2 Finishing operation in order to transport the device: Packing mode” (Page 68).

 For details of the locking knob, see “5. Locking knob” (Page 7) in “1.4 Device Configuration”.

Maintenance

⚠ **CAUTION**

- **When the halogen lamp for eye observation, or the xenon flash lamp for image capture needs to be replaced, contact NIDEK or your authorized distributor.**
 The device incorporates extremely high-voltage components. Opening the lamp house cover or replacing the lamp may result in electric shock.
 For replacement of parts, see “O Parts to be maintained by service personnel” (Page 157).
- **The manager of this device must see that maintenance and preventive inspection are performed at least once a year. If any white spots are found in the maintenance, and the cause is determined to be the contamination of the internal optical system, clean the internal optical system.**
 For details of the inspection, maintenance, and cleaning, contact NIDEK or your authorized distributor.
 If the periodical inspection, maintenance, and cleaning cannot be performed by the user, entrust them to NIDEK or your authorized distributor.
- **Only service personnel trained by NIDEK are allowed to repair and service the device.**
 NIDEK assumes no responsibility for any adverse events resulting from improper servicing.
- **When performing maintenance work, secure a sufficient maintenance space.**
 Maintenance work in an insufficient space may result in injury.
- **When cleaning the device exterior or the LCD touch-screen, do not use organic, abrasive cleaner such as thinner.**
 The device exterior or the LCD touch-screen may be corroded or damaged.
- **Do not use the device beyond its service life.**
 Even with proper maintenance and check, after time, the device reliability or safety may begin to fail to achieve the target values.
- **Before returning the device to NIDEK for repair or maintenance, wipe the exterior of the device (especially the parts that come into contact with patients) with a cloth dampened with rubbing alcohol for disinfection.**

Disposal

⚠ **CAUTION**

- **Follow local governing ordinances and recycling plans regarding disposal or recycling of device components. The device contains a circuit board with a lithium battery mounted. Because the disposal method of lithium batteries varies according to the local government, follow the local governing ordinances and recycling plans when disposing of the circuit board with the lithium battery.**
 It is recommended to entrust the disposal to a designated industrial waste disposal contractor. Inappropriate disposal may contaminate the environment.
- **When disposing of packing materials, sort them by material and follow local governing ordinances and recycling plans.**
 Inappropriate disposal may contaminate the environment.

Connection to Network

⚠ **CAUTION**

- **When connecting to peripheral equipment like a PC with LAN connector via a medical facility network, insert or connect an isolation transformer between medical electrical equipment and the networked device (such as HUB), or the networked device and any other electrical equipment.**

 Depending on the types or numbers of other electrical equipment connected to the network, electric shock or malfunction/failure of the electrical equipment may occur. For installation of a network isolation transformer, consult NIDEK or your authorized distributor.

- **If the PC of this system is connected by a LAN to other devices such as an external computer via a network of the medical facility, do not connect the system to a network that can connect to the Internet.**

 Be sure to configure the local network only with PCs for NIDEK's image filing software (such as NAVIS-EX). NIDEK will not assume responsibility or compensate for damages caused by any virus infection and development.

- **When connecting the device with other equipment in a medical facility through the network, be sure that the connection does not pose any danger to the patient, operator, or any other third persons. When any devices are additionally connected to or disconnected from the network, updated or upgraded, be sure that those changes do not pose any danger to the patient, operator, or any other third persons.**

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1. BEFORE USE

1.1 Device Outline

The NIDEK NON-MYDRIATIC AUTO FUNDUS CAMERA, AFC-330 captures fundus images using a built-in color CCD camera without the use of mydriatic agents. The AFC-330 is useful not only for ophthalmology but also for fundus photography in medical examinations such as for diabetes.
With this single device, registration of patient information, image capture, and viewing of captured images are possible. In addition, captured images can be output to a USB flash drive, and printed using a printer.
By connecting a personal computer (PC) to the device via a LAN and installing the optional image filing system software, images captured by this device can be transferred to the PC at high speed, and viewed and managed on the PC.
The device has the following features:

- Auto shot (automatic image capture) for executing image capture simply by aligning the device to the patient's eye
- Alignment assist functions such as triple axis auto tracking (up, down, right, left, forward, and backward), auto focus, eyelid/required pupil diameter detection, and motorized chinrest
- Small pupil photography mode for pupils as small as 3.3 mm in diameter (angle of view: 33º) in addition to the usual photography mode for pupils of 4 mm or larger in diameter (angle of view: 45º)
- Anterior eye photography mode for easy anterior eye image capture
- Stereo photography mode, and Panorama photography mode for easy stereo and panorama image capture that may be operated automatically
- 8.4-inch, color LCD touch-screen that displays buttons for easy operation and image capture while observing the high quality fundus image, and allows evaluation of the image quality after image capture
- USB2.0 for storing captured images to a USB flash drive, or for direct printing of images with a printer without using a PC
- LAN connection for high-speed transfer of captured images to the PC

1.2 Intended Use

The NIDEK Non-Mydriatic Auto Fundus Camera Model AFC-330 is an ophthalmic camera that is indicated for use in capturing images of the retina and the anterior segment of the eye.

* When the device is used with NAVIS-EX, for which a separate operator's manual is provided, the functions for image review, image processing, and exporting are available. The filed images provide information for reference purposes.

1.3 Principle

○ Alignment

1. Anterior eye observation

Alignment is performed while observing the anterior eye under the anterior eye illumination LED (infrared light) on the LCD touch-screen. When proper alignment is achieved, the fundus observation screen is automatically displayed.

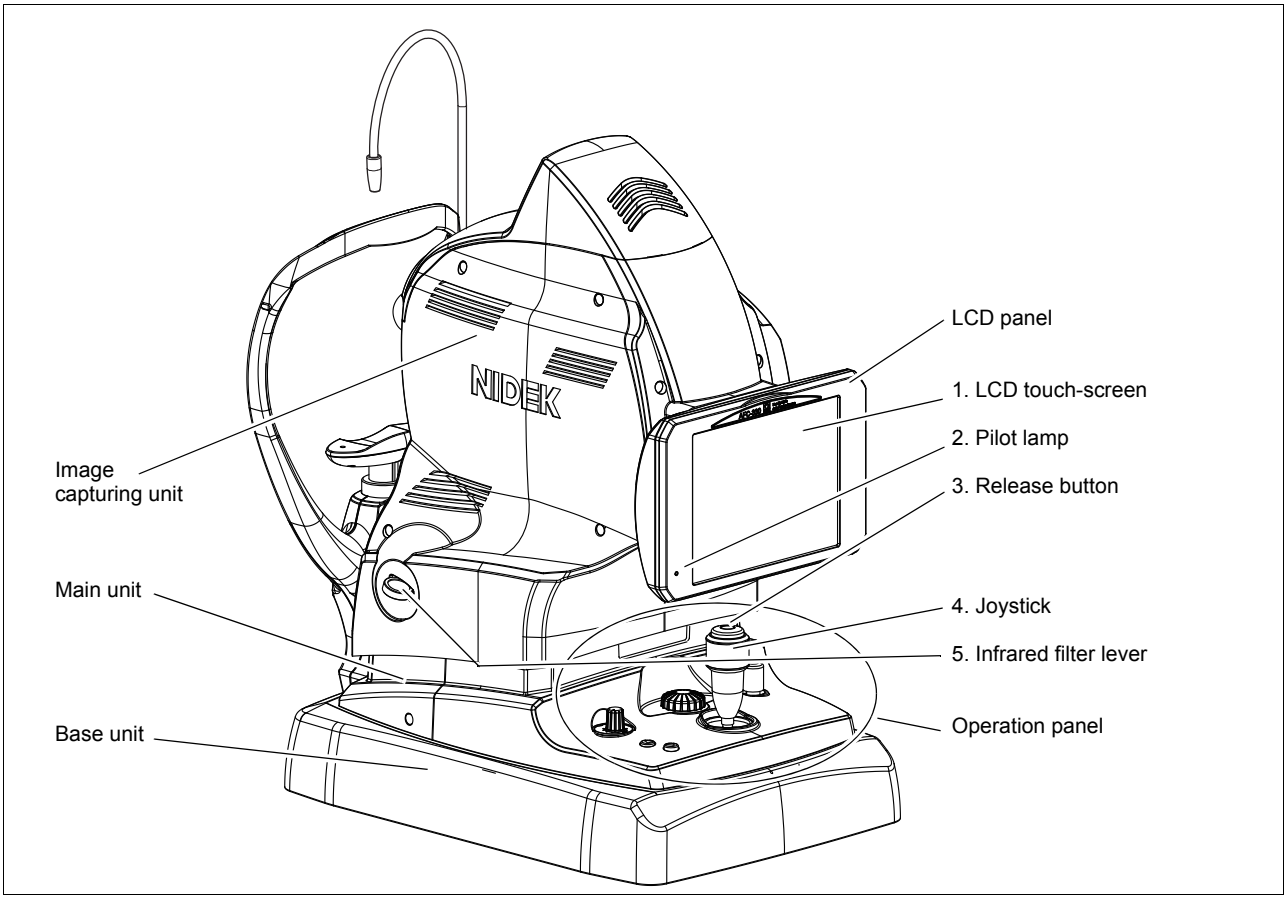
2. Fundus observation

A bundle of light rays from the halogen lamp passes through the infrared filter and becomes infrared light to illuminate the fundus. Alignment and focusing of the device is performed while observing the illuminated fundus on the LCD touch-screen.

○ Image capture

White light from the xenon flash lamp irradiates the anterior eye and fundus. The light reflected from those eye portions forms an image, and the image is captured by the built-in color CCD camera for fundus image capture.

1.4 Device Configuration



1. LCD touch-screen

An 8.4-inch color LCD touch-screen that allows operation of various functions with the buttons displayed on it.

For the displayed contents, see “1.5 Screen Configuration” (Page 10).
The LCD touch-screen can be tilted at various angles by pulling its bottom. If the operator uses the device in a standing posture, tilt the screen at a suitable angle. To return the screen to the original position, raise it as high as it goes (about 45°), then slowly lower it.

Note

- If two or more disparate positions on the LCD touch-screen are touched at the same time, the operation may not be recognized properly.

2. Pilot lamp

Lights up when the device power is on (|).

Blinks when the device is in Sleep mode[*1].

***1. The device enters Sleep mode when it is not operated for the specified period of time.
Select the time from 5, 10, and 15 minutes in “Main unit settings” of “Control menu”.
The factory setting is 5 minutes. (For details of setting, see “○ Main unit settings” (Page 105).)
To restore the device from Sleep mode, press any button or switch the eye by moving the joystick.**

3. Release button

Provides the following four functions:

- Execution of image capture
 The flash is fired and the eye image is captured by the built-in CCD camera.
- The same function as the OK/Auto transfer button or the retry button in the preview screen
- Enabling of image capture with the same conditions (the same eye [left eye if the selected image is left eye] in the same image capture mode) as used for the image selected in the thumbnail screen (same function as the retry button )
- Enabling of image capture with the same conditions as used for the latest image capture when the release button is pressed without selecting any image in the thumbnail screen (same function as the image capture button )

For details of operation in the preview and thumbnail screen, see “[Preview screen]” (Page 24) and “[Thumbnail screen]” (Page 26).

4. Joystick

Used to move the image capturing unit to the desired position.

Tilting the joystick moves the image capturing unit to left, right, forward, and backward. Rotating the grip of the joystick moves the image capturing unit up and down.

It is also used to select the OK/Auto transfer button or the retry button in the preview screen, and to advance images in the thumbnail screen.

Rotate the grip of the joystick to advance images.

For details of the operation in the preview screen, see “[Preview screen]” (Page 24).

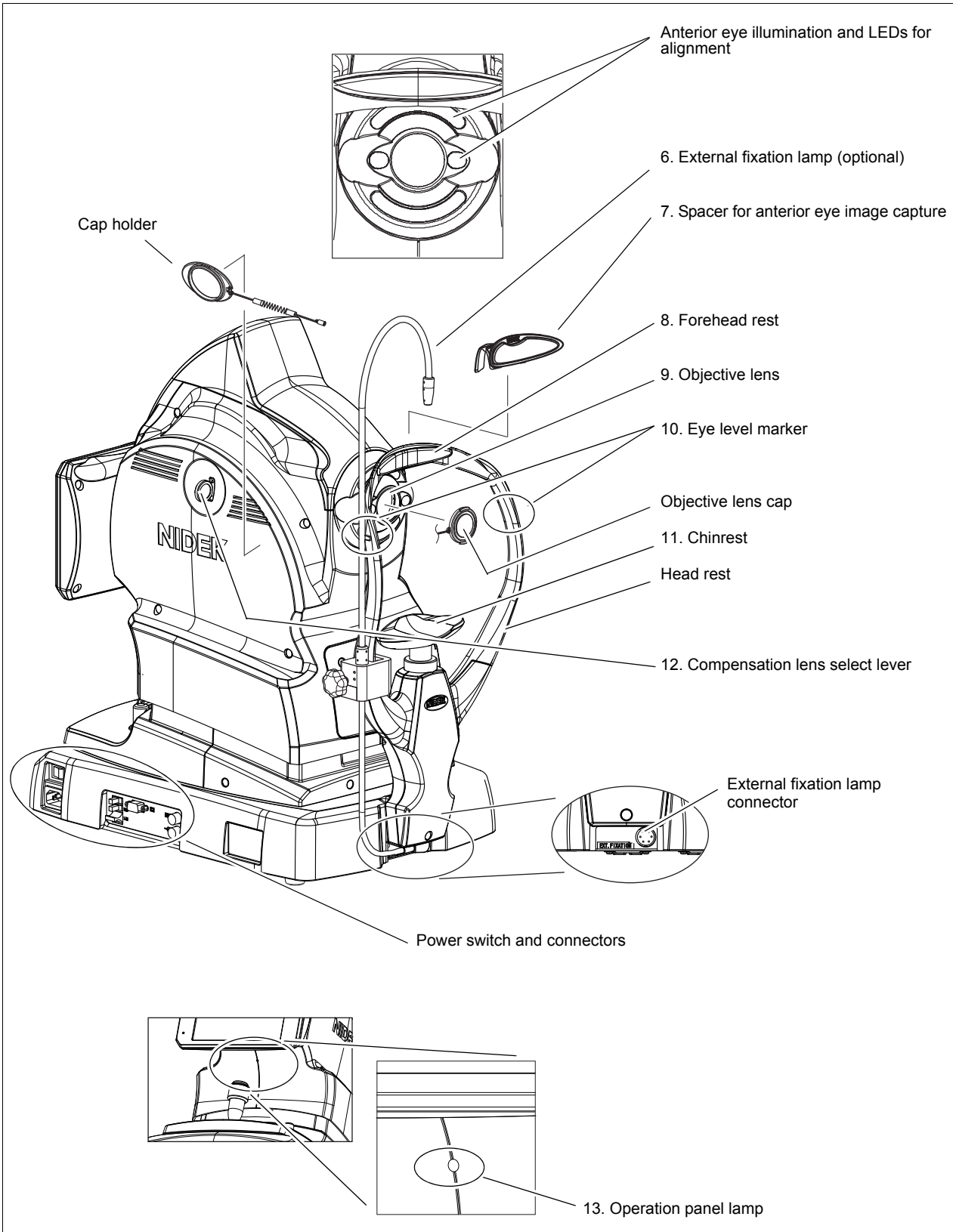
5. Infrared filter lever

Used when cleaning the objective lens.

The infrared filter inside the device can be removed by pulling this knob so that the cleanliness of the objective lens can easily be checked.

When the knob is pulled, the message “Would you like to clean the objective lens?” appears.

For details, see “4.3 Cleaning Objective Lens” (Page 155).


Anterior eye illumination and LEDs for alignment
6. External fixation lamp (optional)
7. Spacer for anterior eye image capture
Cap holder
8. Forehead rest
9. Objective lens
10. Eye level marker
Objective lens cap
11. Chinrest
Head rest
12. Compensation lens select lever
External fixation lamp connector
Power switch and connectors
13. Operation panel lamp

6. External fixation lamp

The external fixation lamp is optionally available.

When the external fixation lamp is connected to the device, it is recognized by the device and becomes available.

For detailed operation, see “2.8.1 Fixation lamp mode” (Page 101).

7. Spacer for anterior eye image capture

Attached to the forehead rest in Anterior eye photography mode.

Clean it before each patient.

8. Forehead rest

The patient’s forehead is rested on the forehead rest to prevent their head from moving.

Clean it before each patient.

9. Objective lens

Check the cleanliness of the objective lens before image capture because it considerably influences the result of image capture. Be sure to cover it with the lens cap when images are not to be captured.

10. Eye level marker

The height of the chinrest is adjusted so that the patient’s eyes are roughly aligned to this eye level marker.

11. Chinrest

Clean the chinrest before each patient.

12. Compensation lens select lever +/–

Used to insert the plus or minus compensation lens when the refractive error of the patient’s eye is out of the range between –12 D and +15 D or when anterior eye images are to be captured.

When either of the two compensation lenses is inserted, neither the focus split nor the split indicator appears. In such a case, the focus needs to be adjusted manually by rotating the focus knob while observing the fundus image in the LCD touch-screen.

–: When the lever is pulled to the first stop, the minus lens is inserted into the optical path and a “–” indication is displayed at the bottom right of the screen. Images of an eye with refractive error of –33 D to –7 D can be captured using the minus lens.

+: When the lever is pulled to the second stop, the plus lens is inserted into the optical path with a “+” indication displayed at the bottom right of the screen. Images of an eye with refractive error of +11 D to +35 D, or anterior eye can be captured.

Note

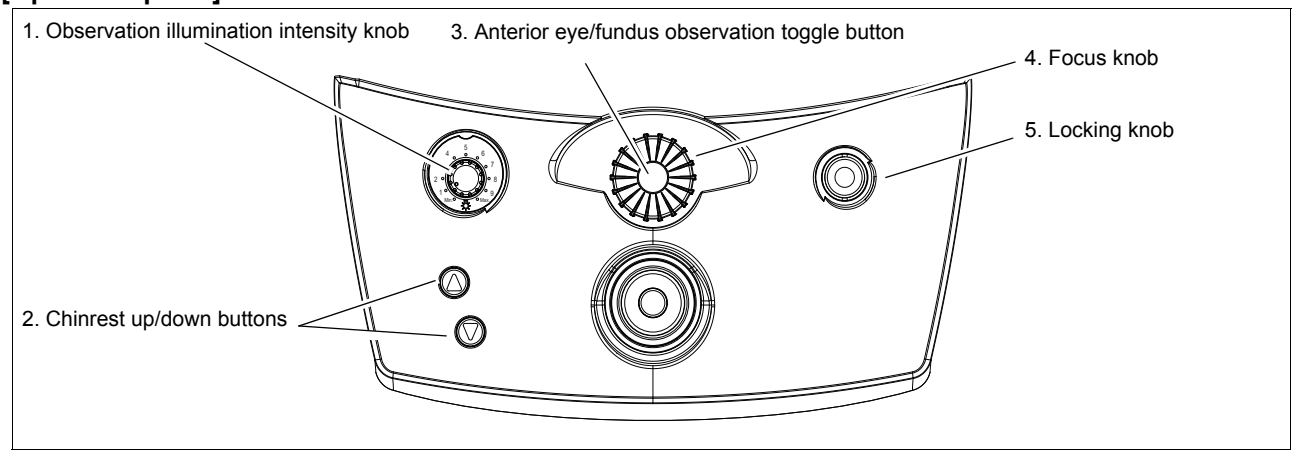
- Be sure to pull the compensation lens select lever to a position where a click is felt.

 If pulled to an intermediate position, the right or left side of the image becomes dark and proper images cannot be captured.

13. Operation panel lamp

Illuminates the operation panel for operability in a dark environment.

[Operation panel]



1. Observation illumination intensity knob

Turned to adjust the illumination intensity for fundus observation.

Scale: Min., 1, 2,.....8, 9, Max.

Clockwise: Intensity is increased.

Counterclockwise: Intensity is reduced.

2. Chinrest up/down buttons

Pressed to adjust the chinrest height.

: Pressed to lower the chinrest.

: Pressed to raise the chinrest.

3. Anterior eye/fundus observation toggle button

Pressed to toggle between the anterior eye observation and the fundus observation screens.

4. Focus knob

Turned to adjust the focus of the fundus image to be captured. This knob is turned so that the focus split forms a single line or only a single line of the split indicator is displayed in the LCD touch-screen.

If the image focus cannot be fully adjusted by this knob, insert a compensation lens by pulling the compensation lens select lever on the right side of the image capturing unit as viewed from the operator. When either of the two compensation lenses is inserted, neither the focus split nor the split indicator appears. In such a case, the focus needs to be adjusted manually by rotating the focus knob while observing whether the proper focus is obtained.

5. Locking knob

Used to lock the main unit to the base unit.
There are two methods of locking as shown below.

Temporary locking

Rotating the locking knob clockwise temporarily locks the main unit to the base unit at the desired position. Use this function to lock the main unit temporarily during use of the device.

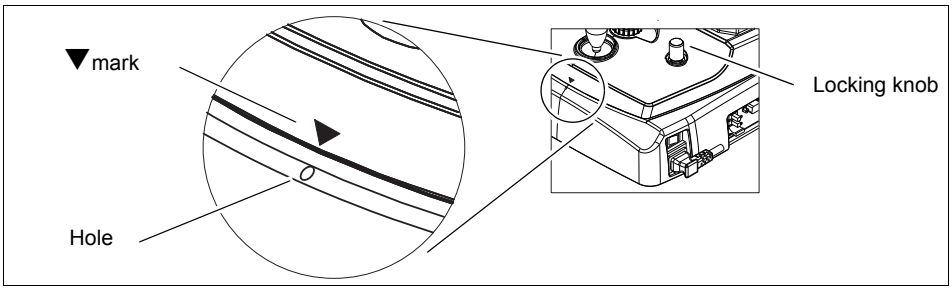
Secure locking for moving the device

This function is used to lock the main unit securely to the base unit when moving the device to another place.

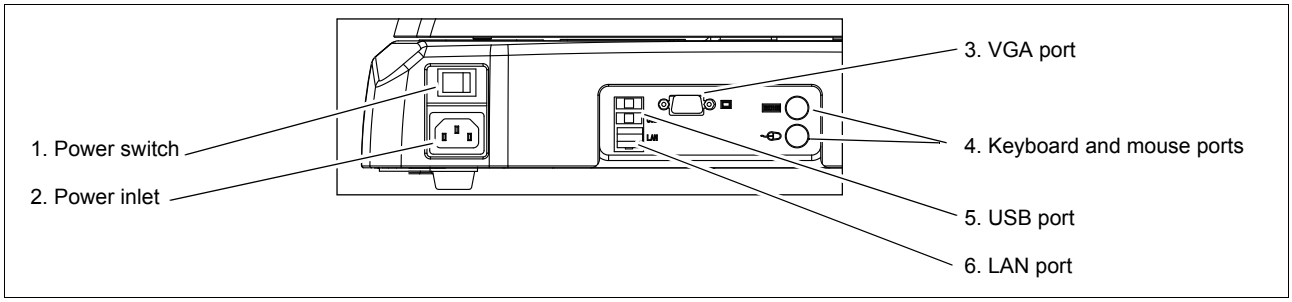
1. Align the ▼ mark on the main unit to the hole in the center of the base unit of the operator's side.
2. Pressing and rotating the locking knob counterclockwise securely locks the main unit to the base unit.

⚠ **CAUTION** • **Never lock the main unit using the locking knob when the device is packed and transported.**

The device may be damaged by vibration and bumping.



[Power switch and ports]



1. Power switch

Press the On (|) side to turn on power to the device.

When turning off power to the device, be sure to press the shutdown button at the top left of the LCD touch-screen, then wait for the instruction to turn off the power switch to appear before turning off the power switch.

2. Power inlet

Connect the removable power cord.

3. VGA port

Not used. Do not connect any device.

4. Keyboard port, mouse port

Not used. Do not connect any device.

5. USB port

The two USB ports (USB 2.0 supported) are used to connect USB devices such as a USB flash drive or an external color printer. Do not connect any other devices.

Captured images can be transferred to the USB flash drive, or printed using the printer.

When a USB device is connected to the USB connector for the first time, the driver needs to be registered in Driver install mode. For details, see “3.1 Connection of USB devices” (Page 139).

For precautions in the connection, see “During Use” (Page V), “2.2 Image Capture Preparation” (Page 55), and “3 OPERATION FOR WHEN PERIPHERAL DEVICES ARE CONNECTED” (Page 139).

6. LAN port

Used to connect to an Ethernet network.

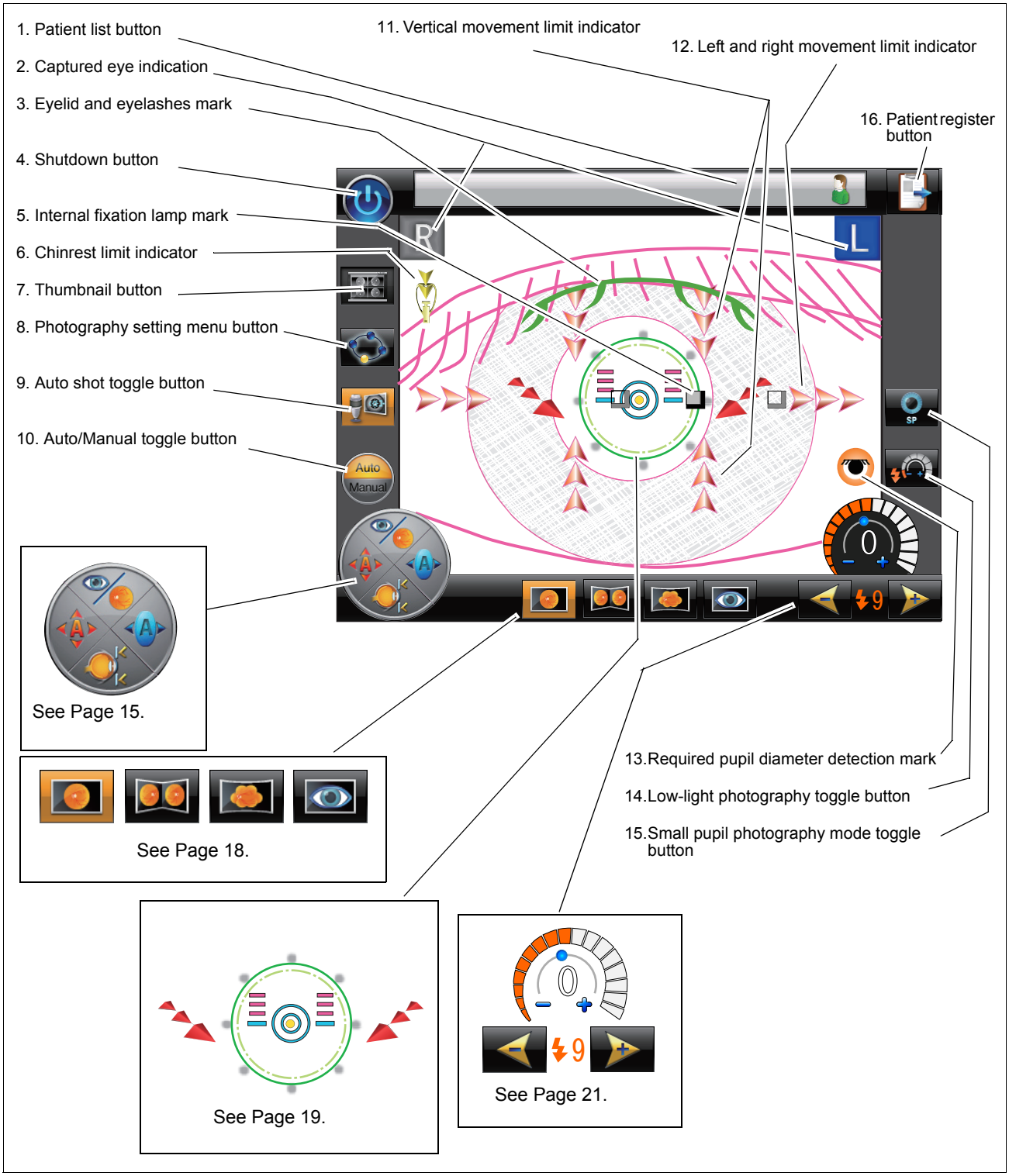
To connect to an Ethernet network, LAN needs to be set up in the menu screen that appears by pressing the photography setting menu button .

The device is connected to an Ethernet network by service personnel of NIDEK or your authorized distributor after obtaining permission from the network administrator of the facility.

Before connecting cables, be sure to turn off power to the connected units. (See “During Use” (Page V), “Connection to Network” (Page XI), and “3 OPERATION FOR WHEN PERIPHERAL DEVICES ARE CONNECTED” (Page 139).)

1.5 Screen Configuration

[Anterior eye observation screen - 1]



1. Patient list button 

Used to display the patient list screen that allows selection of the patient for whom images are to be captured, editing of the existing patient information, and registration of new patients. The ID and name of the patient being selected are shown in this button.

When the Patient ID quick registration function is set to ON, the button changes to . (The icon of a person disappears.) (See "○ Patient ID quick registration function" (Page 90).)

2. Captured eye indication

Indicates whether the captured eye is the left or right eye.

These icons are always displayed and the icon of the captured eye is displayed in blue.

The indication can be toggled between R/L and OD/OS.

The default setting is R/L.

For details, see "○ Main unit settings" (Page 105).

: Always displayed on the top left of the screen. When it is displayed in blue, the captured eye is the right eye.

: Always displayed on the top right of the screen. When it is displayed in blue, the captured eye is the left eye.

3. Eyelid and eyelashes mark 

This mark is displayed in green in the anterior eye observation screen when the auto shot is active. When the patient's eyelids and eyelashes are above this mark, they do not interfere with image capture. This mark disappears when the fundus observation screen is displayed.

Note

- The positions of eyelids and eyelashes differ by patient. Use the eyelid and eyelashes mark as a guideline of how wide the patient's eye is opened.

4. Shutdown button 

Pressed at first to turn off power to the device,

Temporary data in the device can be protected by this operation.

5. Internal fixation lamp mark

Indicates the internal fixation lamp position and its movable positions.

: Indicates the position where the internal fixation lamp is currently illuminated.

: Indicates a position to which the internal fixation lamp can be moved. When it is pressed, the internal fixation lamp illuminates at the pressed position.

The available number and positions for the internal fixation lamp change depending on the internal fixation lamp mode (, , or ) that can be selected in the Photography settings menu screen.

For details, see "2.8.1 Fixation lamp mode" (Page 101).

Note

- The internal fixation lamps at peripheral positions may not be visible to the patient depending on conditions.

6. Chinrest limit indicator

Indicates that the chinrest is at the limit of the vertical movement range.



When this icon is displayed, the chinrest is at the upper limit of the vertical movement range.



When this icon is displayed, the chinrest is at the lower limit of the vertical movement range.

7. Thumbnail button 

Used to display thumbnails of captured images.

If any image exists for the selected patient, this button is displayed in color and pressing it displays thumbnails. When the button is displayed in black and white, there is no thumbnail to be displayed.

8. Photography setting menu button 

Used to open the Photography settings menu screen for various settings such as the fixation lamp mode and the camera settings.

9. Auto shot toggle button

Used to enable auto shot image capture. When the button is displayed in color (orange background), auto shot image capture is enabled.

Each pressing of this button toggles the color between black and white (disabled) and full color (enabled).

In addition, auto shot image capture can be executed with or without blink detector depending on the setting in the Photography options screen.

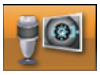
 : Without blink detector

Image capture is automatically executed when the optimum alignment and focus are achieved in the fundus observation screen.

 : With blink detector

When the optimum alignment and focus are achieved in the fundus observation screen, a message appears to instruct the patient to blink. When a blink is detected, image capture is automatically executed.

For details of the auto shot, see “2.6.2 Auto shot” (Page 80).

10. Auto/Manual toggle button 

When the upper half of the button is orange (automatic functions enabled), image capture is automatically executed when the auto tracking, and automatic advancement from the anterior eye to fundus observation screen, and auto focus are enabled in the alignment.

When the lower half of the button is orange (automatic functions disabled), the auto tracking, auto switching from anterior eye to fundus, and automatic advancement from the anterior eye to fundus observation screen, and auto focus are disabled in the alignment. In such a case, image capture needs to be performed manually.

Each pressing of this button toggles between Auto and Manual.

11. Vertical movement limit indicator

Indicates that the image capturing unit is at the limit of the vertical movement range in the anterior eye and fundus observation screens.



When this icon is displayed in the upper half of the screen, the image capturing unit is at the upper limit of the vertical movement range. Lower the image capturing unit.



When this icon is displayed in the lower half of the screen, the image capturing unit is at the lower limit of the vertical movement range. Raise the image capturing unit.

Note

- When the auto tracking is enabled, rotating the joystick to raise the image capturing unit may not make the vertical movement limit indicator icon disappear. In such a case, raise the chinrest.

12. Left and right movement limit indicator

Indicates that the image capturing unit is at the limit of the left or right movement range in the anterior eye or fundus observation screens.



When this icon is displayed on the screen, the image capturing unit is at the limit of the left movement range. Tilt the joystick a little to the right.



When this icon is displayed on the screen, the image capturing unit is at the limit of the right movement range. Tilt the joystick a little to the left.

13. Required pupil diameter detection mark  , 

Indicates whether or not the patient's eyelid is covering their eye and whether or not their pupil size satisfies the required pupil diameter (or the minimum pupil diameter in Small pupil photography mode).

 : Indicates that the patient's eyelid is not covering their eye, and that their pupil size satisfies the required pupil diameter (or the minimum pupil diameter in Small pupil photography mode). When this mark is displayed, image capture can be executed.

 (black and white): Indicates that the patient's eyelid is covering the patient's eye, or that their eye is not detected.

 (color): Indicates that the patient's eyelid is detected, the pupil size does not satisfy the required pupil diameter (or the minimum pupil diameter in Small pupil photography mode) in the anterior eye or fundus observation screen, or that extraneous light or such (noise) is detected.

This mark is not displayed in Anterior eye photography mode.

14. Low-light photography toggle button 

Used to lower the flash intensity for image capture by the specific amount from the current flash intensity.

For details of this button, see "2.5.5 Low-light photography mode" (Page 79).

This button is displayed when the Low-Light setting is ON in the Photography Modes screen (not displayed when the setting is OFF).

15. Small pupil photography mode toggle button 

Pressing this button toggles use of Small pupil photography mode between ON and OFF.

 (Black background): Small pupil photography mode is OFF (Usual image capture)

The usual image capture is executed for an eye that satisfies the required pupil diameter (4.0 mm or larger in diameter).

 (Orange background): Small pupil photography mode is ON.

Image capture is executed for an eye that does not satisfy the required pupil diameter but satisfies the minimum pupil diameter (3.3 mm or larger in diameter).

This button is displayed when the Small Pupil setting is ON in the Photography Modes screen (not displayed when the setting is OFF).

When the “Auto switch to SP photography mode” setting is ON in the Photography options screen, the device determines whether the patient’s pupil size satisfies the required pupil diameter, then automatically enables or disables Small pupil photography mode. If the operator enables Small pupil photography mode by pressing this button when the patient’s pupil size satisfies the required pupil diameter, Small pupil photography mode is disabled in about three seconds.

For details of the setting, see “○ Photography modes” (Page 111) and “○ Photography options” (Page 113).
(Default setting: Small Pupil—ON, Auto switch to SP photography mode—OFF)

In Small pupil photography mode, flare may be captured outside the image capture range mark.

For details, see “2.5.4 Small pupil photography mode” (Page 76).

16. Patient register button 

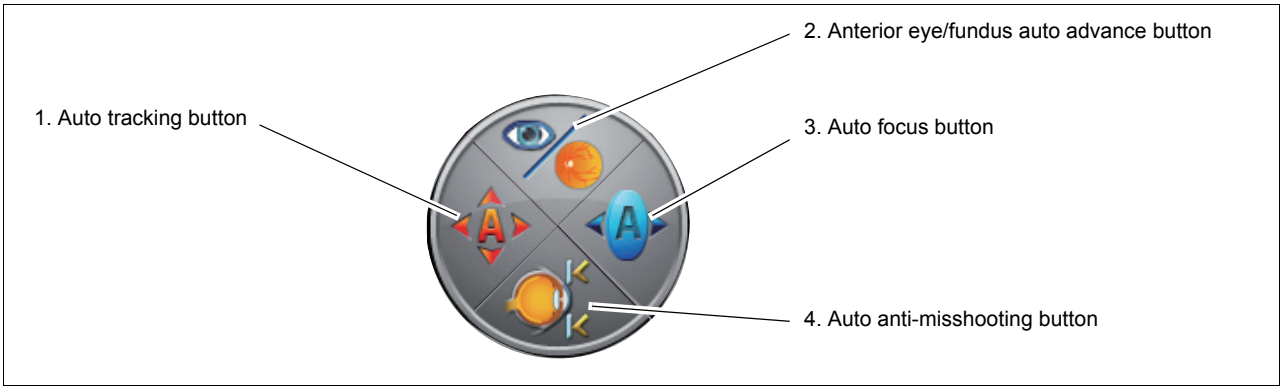
Used to register a new patient. Pressing this button on the anterior eye observation screen displays the new patient register screen.

However, this button does not appear in the anterior eye observation screen when anterior eye image capture is selected.

When the Patient ID quick registration function is set to ON, the next patient button is displayed at the same position.

(For the Patient ID quick registration function, see “○ Patient ID quick registration function” (Page 90) and “○ Operation settings” (Page 106).)

[Anterior eye observation screen - 2]



1. Auto tracking button 

Used to toggle use of the auto tracking (enabled [two sensitivity levels] or disabled).

When the device detects the cornea-reflected spots arranged in a circle in the anterior eye observation screen, the image capturing unit automatically moves up, down, right, left, forward, and backward to achieve a proper alignment.

When the button is displayed in color, two sensitivity levels are available: high and low.

When the auto tracking is disabled, the button is displayed in black and white.



: A blue display indicates low sensitivity.

: An orange display indicates high sensitivity.

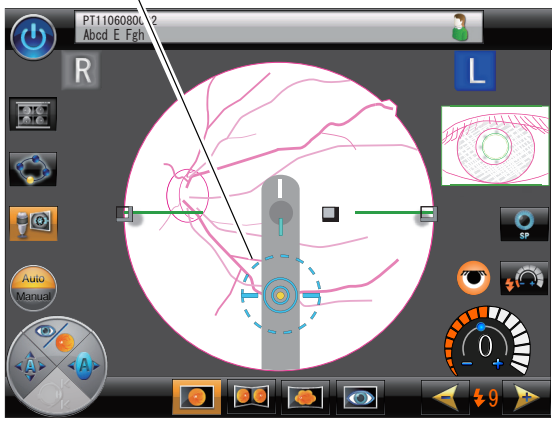
: A black and white display indicates that the auto tracking is disabled.

Each pressing of this button changes the color in the following order: orange (high sensitivity), black and white (disabled), and blue (low sensitivity).

The default setting is orange (auto shot enabled with high sensitivity).

When the internal fixation lamp blinks around the center with low-sensitivity auto tracking, a broken circle appears around the target mark in the fundus observation screen.

Broken circle



* This button is disabled when Manual  is selected with the Auto/Manual toggle button.

2. Anterior eye/fundus auto advance button 

Used to toggle use of automatic advancement from the anterior eye observation screen to the fundus observation screen.

When the automatic advancement is enabled, completing the alignment in the anterior eye observation screen automatically displays the fundus observation screen.

The automatic advancement is only for advancement from the anterior eye observation screen to the fundus observation screen. Once the fundus observation screen is displayed, the screen cannot be returned to the anterior eye observation screen with the automatic advancement.

A colored display indicates that the function is enabled. A black and white display indicates that the function is disabled.

Each pressing of this button toggles use of the automatic advancement.

With the default setting, the auto advancement is enabled.

* This button is disabled when Manual 

is selected with the Auto/Manual toggle button.

3. Auto focus button 

Used to toggle use of the auto focus.

When auto focus is enabled, focus is automatically adjusted when the anterior eye observation screen is switched to the fundus observation screen.

A colored display indicates the function is enabled. A black and white display indicates the function is disabled.

Each pressing of this button toggles use of the auto focus.

With the default setting, the auto focus is enabled.

* This button is disabled when Manual 

is selected with the Auto/Manual toggle button.

* Even when the auto focus is enabled, setting the focus bar to off or inserting the compensation lens makes the auto focus unavailable and the auto focus button is displayed in black and white.

4. Auto anti-misshooting button 

Used to toggle use of the function that automatically determines whether or not to execute image capture when the release button is pressed or when image capture is ready with the auto shot based on the result of eyelid detection and required pupil diameter detection.

This function prevents improper image capture (misshooting) when the patient’s eyelid is lowered or the pupil is contracted.

A colored display indicates that the function is enabled. A black and white display indicates that the function is disabled.

Each pressing of this button toggles use of the auto anti-misshooting.

With the default setting, the auto anti-misshooting is disabled.

When disabled

Even if the patient's eyelid is detected or the required pupil diameter is not satisfied (minimum pupil diameter in Small pupil photography mode) (being displayed), image capture can be executed with the auto shot or by pressing the release button.

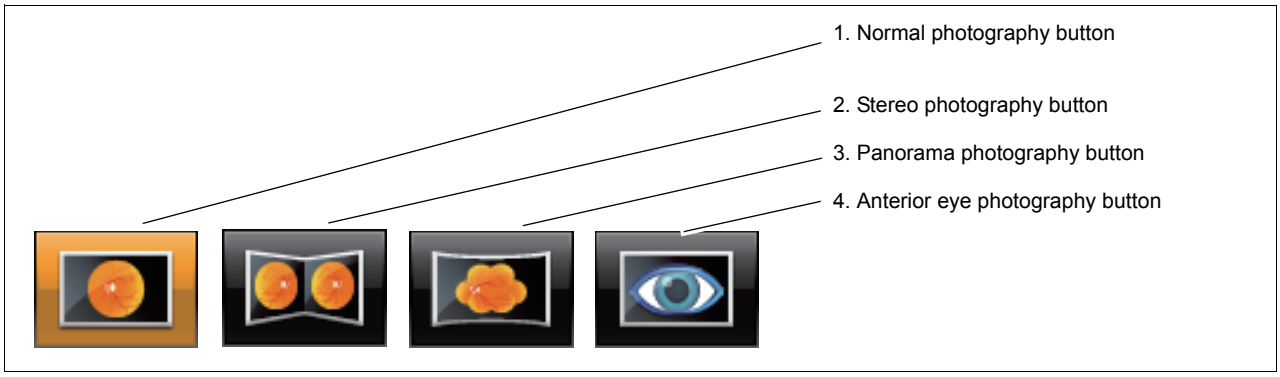
When enabled

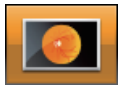
The auto anti-misshooting button is displayed in color.

If the cornea-reflected spots are not detected or the pupil edge is within the required pupil diameter mark, the required pupil diameter mark and the minimum pupil diameter mark are displayed in pink. When the cornea-reflected spots are detected, the eyelid or eyelashes are not detected, and the pupil satisfies the required size, the minimum pupil diameter mark is displayed in green.

If the patient's eyelid is detected or the required pupil diameter is not satisfied (minimum pupil diameter in Small pupil photography mode) (being displayed), image capture cannot be executed with the auto shot or by pressing the release button.

[Anterior eye observation screen - 3]



1. Normal photography button 

Used to enable Normal photography mode. When it is enabled, the button background is displayed in orange.

When another photography mode is selected, the button background is displayed in black and white.

Normal photography mode is the default photography mode.

2. Stereo photography button 

Used to enable Stereo photography mode. When it is enabled, the button background is displayed in orange.

When another photography mode is selected, the button background is displayed in black and white.

See “2.5.1 Stereo photography mode” (Page 70).

3. Panorama photography button 

Used to enable Panorama photography mode. When it is enabled, the button background is displayed in orange.

When another photography mode is selected, the button background is displayed in black and white,.

See “2.5.2 Panorama photography mode” (Page 72).

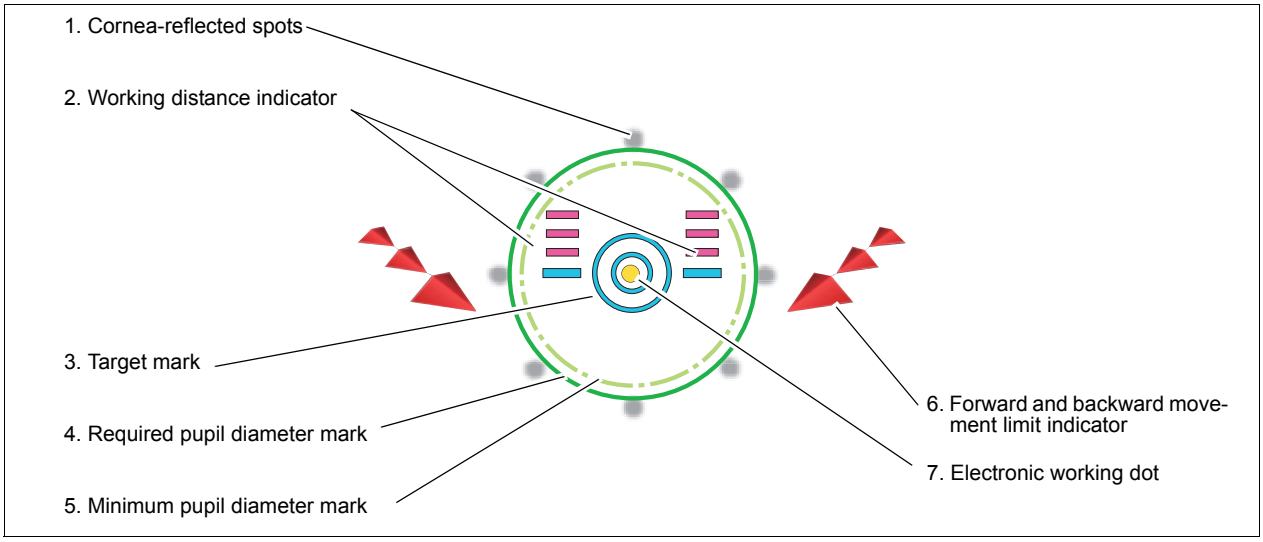
4. Anterior eye photography button 

Used to enable Anterior eye photography mode. When it is enabled, the button background is displayed in orange.

When another photography mode is selected, the button background is displayed in black and white.

See “2.5.3 Anterior eye photography mode” (Page 74).

[Anterior eye observation screen - 4]



1. Cornea-reflected spots

When the anterior eye of the patient is displayed in the anterior eye observation screen, eight cornea-reflected spots appear arranged in a circle. These cornea-reflected spots are used as a guideline for alignment.

These spots are also used for detection of up, down, left, right, forward, and backward positions in the auto tracking, and display of the electronic working dot and the working distance indicator.

2. Working distance indicator

Indicates the distance between the image capturing unit and the patient's eye. Move the joystick in the forward and backward directions so that only a single line of the working distance indictor is displayed. When the alignment becomes optimum in all directions (up, down, left, right, forward, and backward) in the anterior eye observation screen, the color of the indicator changes from light blue to yellow.

3. Target mark

Indicates detection condition of the cornea-reflected spots for alignment.

 : Alignment condition is not detected.

 : Alignment condition is detected.

When the alignment becomes optimum in all the directions (up, down, left, right, forward, and backward) in the anterior eye observation, the color of the indicator changes from light blue to yellow.

4. Required pupil diameter mark

Indicates the required pupil diameter (pupil diameter required for proper image capture) in usual photography mode.

In usual photography mode, the patient's pupil diameter needs to be larger than this required pupil diameter mark (4 mm in diameter). Check whether the pupil is larger than the required pupil diameter mark (4 mm-diameter solid-line circle) in the anterior eye observation screen.

When the auto anti-misshooting is enabled , or if the cornea-reflected spots are not detected, or the pupil edge is within the required pupil diameter mark, the required pupil diameter mark and the minimum pupil diameter mark are displayed in pink. When the cornea-reflected spots are detected, the eyelid or eyelashes are not detected, and the pupil satisfies the required size, the minimum pupil diameter mark is displayed in green.

5. Minimum pupil diameter mark

Indicates the minimum pupil diameter (3.3 mm-diameter dotted circle) in Small pupil photography mode.

When the auto anti-misshooting is enabled , like the required pupil diameter mark, if the cornea-reflected spots are not detected, or the pupil edge is inside the required pupil diameter mark, the required pupil diameter mark and the minimum pupil diameter mark are displayed in pink. When the cornea-reflected spots are detected, the eyelid or eyelashes are not detected, and the pupil satisfies the required size, the minimum pupil diameter mark is displayed in green.

Image capture interval display function

Shows the elapsed time after image capture by changing the color of the minimum pupil mark clockwise gradually from red to green starting from the twelve o'clock position.

For details of display, see “2.6.6 Image Capture interval” (Page 84).

For details of image capture interval display function, see “○ Photography options” (Page 113).

6. Forward and backward movement limit indicator

Indicates that the image capturing unit is at the limit of the forward or backward movement range in the anterior eye or fundus observation screen.



When this icon is displayed, the image capturing unit is at the limit of the forward movement range. Tilt the joystick a little back.



When this icon is displayed, the image capturing unit is at the limit of the movement range toward the operator. Tilt the joystick a little forward.

7. Electronic working dot

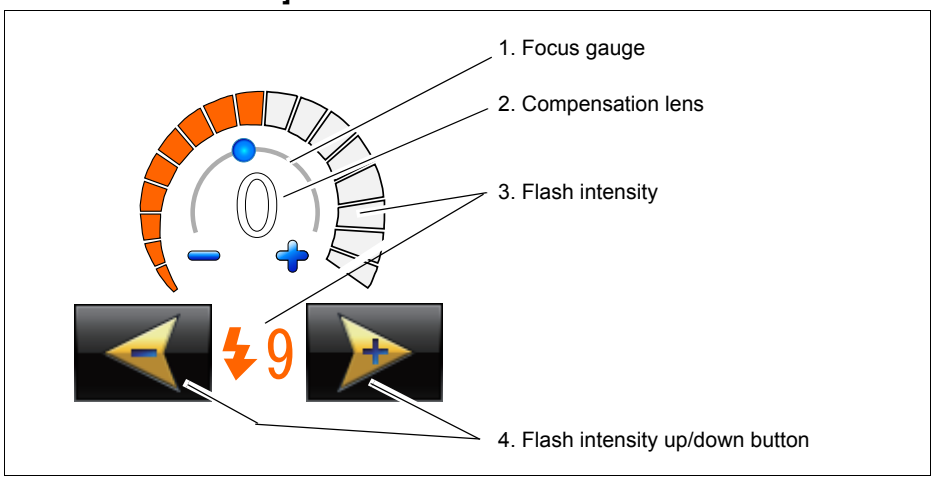
When the device detects the eight cornea-reflected spots, a yellow electronic working dot appears in the center of the circle formed by the cornea-reflected spots.

Use the joystick to align the electronic working dot to the center of the target mark in the anterior eye observation or fundus observation screen.

Note

- If the patient’s eyelid is not opened wide enough or their cornea has any lesions or such, the eight cornea-reflected spots may not be detected and the electronic working dot may not be displayed.

[[Anterior eye observation screen - 5]



1. Focus gauge 

Serves as a guideline for focusing.

In the fundus observation screen, activating the auto focus or rotating the focus knob moves the blue ball along the arc of the circle to show the degree of diopter adjustment.

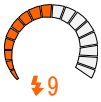
2. Compensation lens

Displays the condition of the compensation lens.

0: No compensation lens is inserted.

+: The plus compensation lens is inserted.

−: The minus compensation lens is inserted.

3. Flash intensity 

Displays the set flash intensity (at the time of image capture). The flash intensity can be selected among 17 levels.

The flash intensity level is displayed numerically and by the amount of area colored orange along the scale.

4. Flash intensity up/down buttons

Used to adjust the flash intensity for image capture in the range from FL1 to FL17.

: Used to reduce the flash intensity.

: Used to increase the flash intensity.

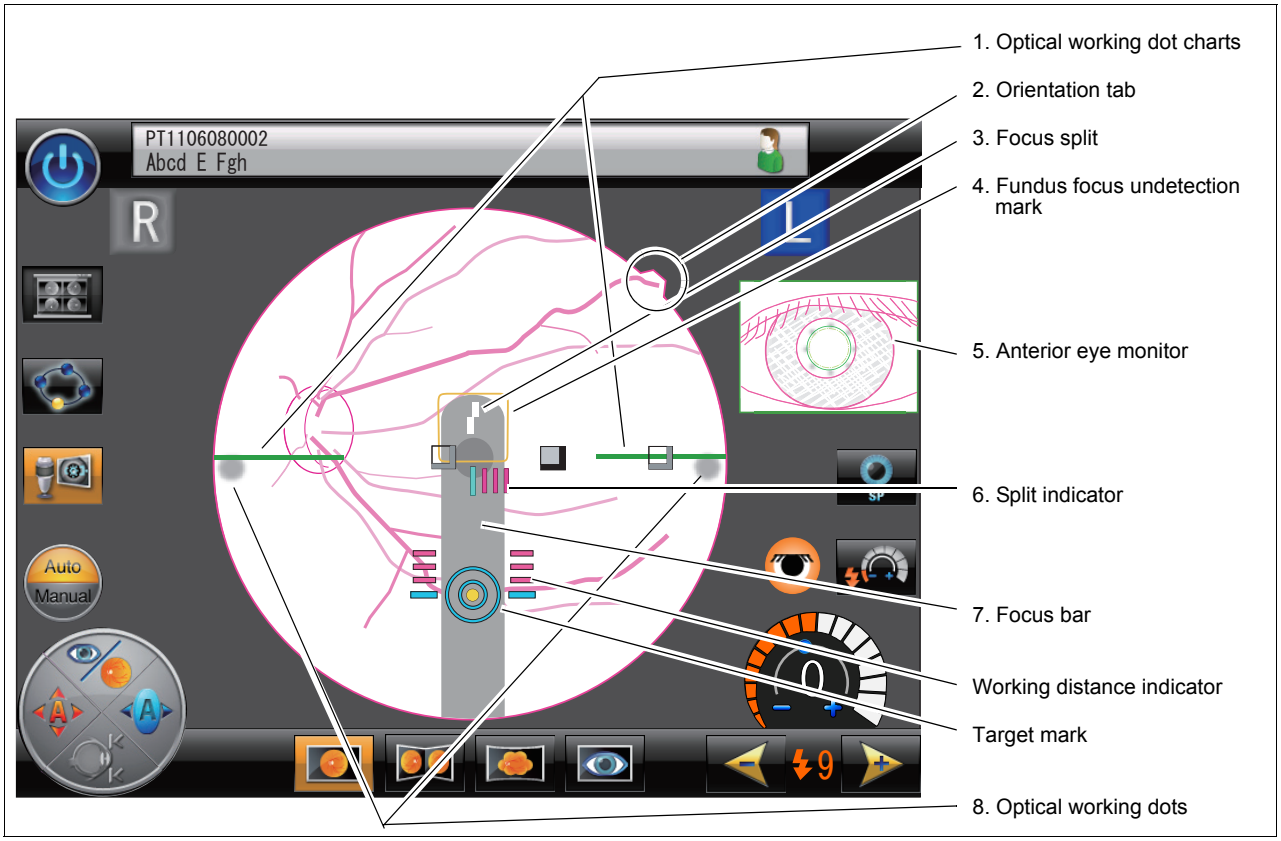
The default flash intensity differs depending on the specified ISO speed of the camera.

ISO 100: FL13
ISO 200: FL9
ISO 400: FL5

The default setting can be changed in the Photography options screen.

[Fundus observation screen]

In Normal photography mode



1. Optical working dot charts

Used as a guideline of the vertical position for proper image capture. When the two optical working dots are clearly visible and positioned on the optical working dot charts, the image capturing unit is in a proper vertical position for image capture.

2. Orientation tab

Used to show the orientation of captured images.

The orientation tab is not displayed for anterior eye images.

3. Focus split

Indicates the focus condition on the fundus by the displacement between the upper and lower lines.

The focus is optimum when a single line is formed by the upper and lower lines.

4. Fundus focus undetection mark

Indicates that the auto focus did not succeed (with the refractive error of the patient's eye is outside the range of -12 D and +15 D) when the anterior eye observation screen changed to the fundus observation screen.

This mark blinks six times on the appearance of the fundus observation screen, then disappears. In such a case, perform focusing by the focus knob.

5. Anterior eye monitor

Displays the anterior eye image in the fundus observation screen.

It allows checking of a possible shift in alignment.

6. Split indicator

Shows the amount of focus deviation in the fundus observation screen.

Adjust the focus using the focus knob so that only a single line is displayed.

7. Focus bar

The focus split is projected on this focus bar.

It appears in black in the fundus observation screen and is moved out of the image capture area at the time of image capture.

8. Optical working dots

Used for fine alignment in the fundus observation screen or alignment when the electronic working dot is not displayed due to failure to detect the cornea-reflected spots.

Left, right, up, and down directions:

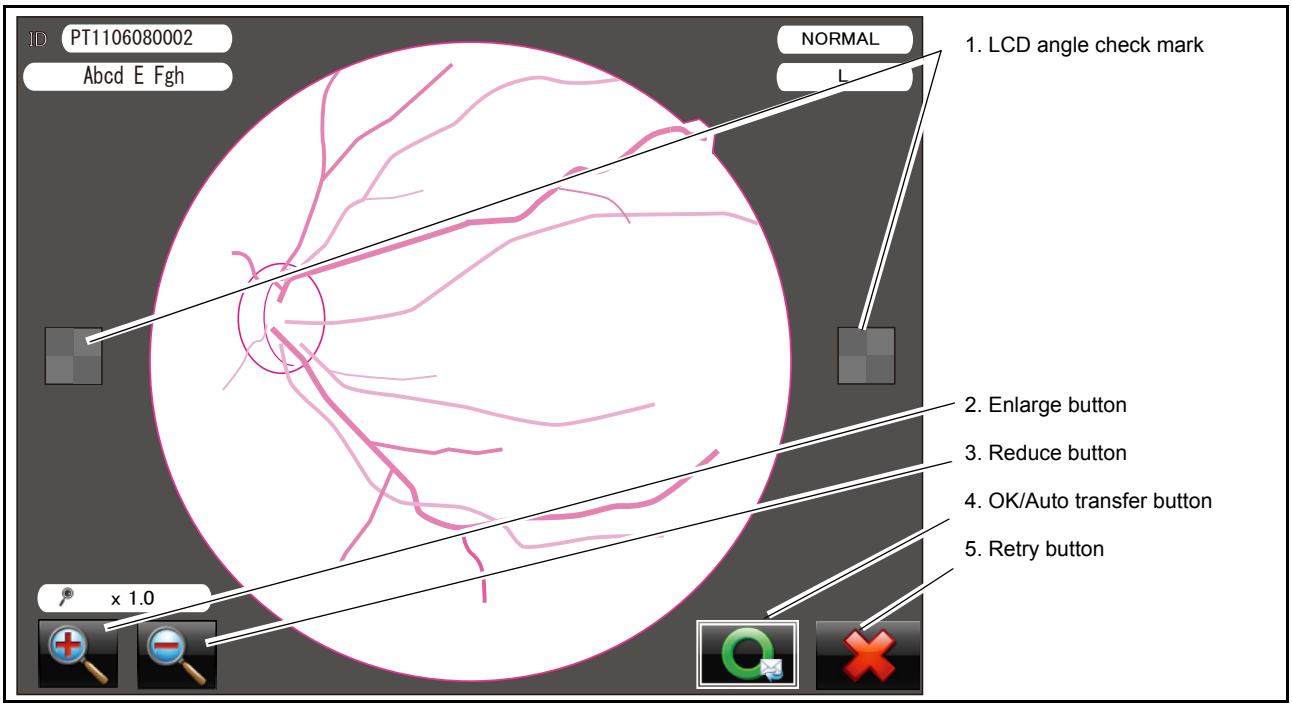
Align the left and right optical working dots symmetrically on the left and right optical working dot charts.

Forward and backward directions:

Perform the alignment so that the optical working dots can be seen most clearly.

[Preview screen]

Displays captured image for confirmation immediately after image capture.



1. LCD angle check mark

Indicates whether the LCD touch-screen is at an appropriate angle for confirmation of captured images.

When the angle of the LCD touch-screen is not appropriate, captured images cannot be confirmed clearly. Be sure to confirm images at an angle at which the color of the LCD angle check mark can be viewed evenly.

(even color): Indicates that the LCD touch-screen is at an optimum angle.

(checkered pattern): Indicates that the LCD touch-screen is at an improper angle.

2. Enlarge button

Used to enlarge the image gradually from x1.0 to x8.0 as follows: x1.0, x2.0, x4.0, x8.0.

Pressing the reduce button reduces the image in the reverse order.

When the image enlarged to x2.0, x4.0, or x8.0 is touched, the touched part comes to the center of the screen.

This button is displayed also at the bottom left of the review screen that displays a saved image.

3. Reduce button

Used to reduce the image gradually from x1.0 to x0.25 as follows: x1.0, x0.75, x0.5, x0.25.

Pressing the enlarge button enlarges the image in the reverse order.

This button is displayed also at the bottom left of the review screen that displays a saved image.

4. OK/Auto transfer button 

Used to transfer the preview image to the connected external storage device such as a USB flash drive.

After the preview image is transferred, the review screen appears.

The same operation can be executed by selecting the button with the joystick and pressing the release button.

However, if no external storage device such as a PC or a USB flash drive is specified as the destination of image transfer, or if the Auto transfer setting for “USB” is set to OFF in the Control menu screen (see ”〇 Transfer” (Page 121) in 2.9.3), the OK/Auto transfer button becomes the OK button  that saves captured images only to the device instead of transferring them also to the external storage device.

Note

- The format of the data to be transferred to the specified destination can be selected depending on the type of the storage device that is being connected. (see ”〇 Transfer” (Page 121).)

5. Retry button 

Used to return to the anterior eye observation screen for execution of alignment and image capture can be executed again without saving the preview image.

Although the captured image is not transferred to the USB flash drive, the captured image is temporarily saved in the device.

The same operation can be executed by selecting the button with the joystick and pressing the release button.

Note

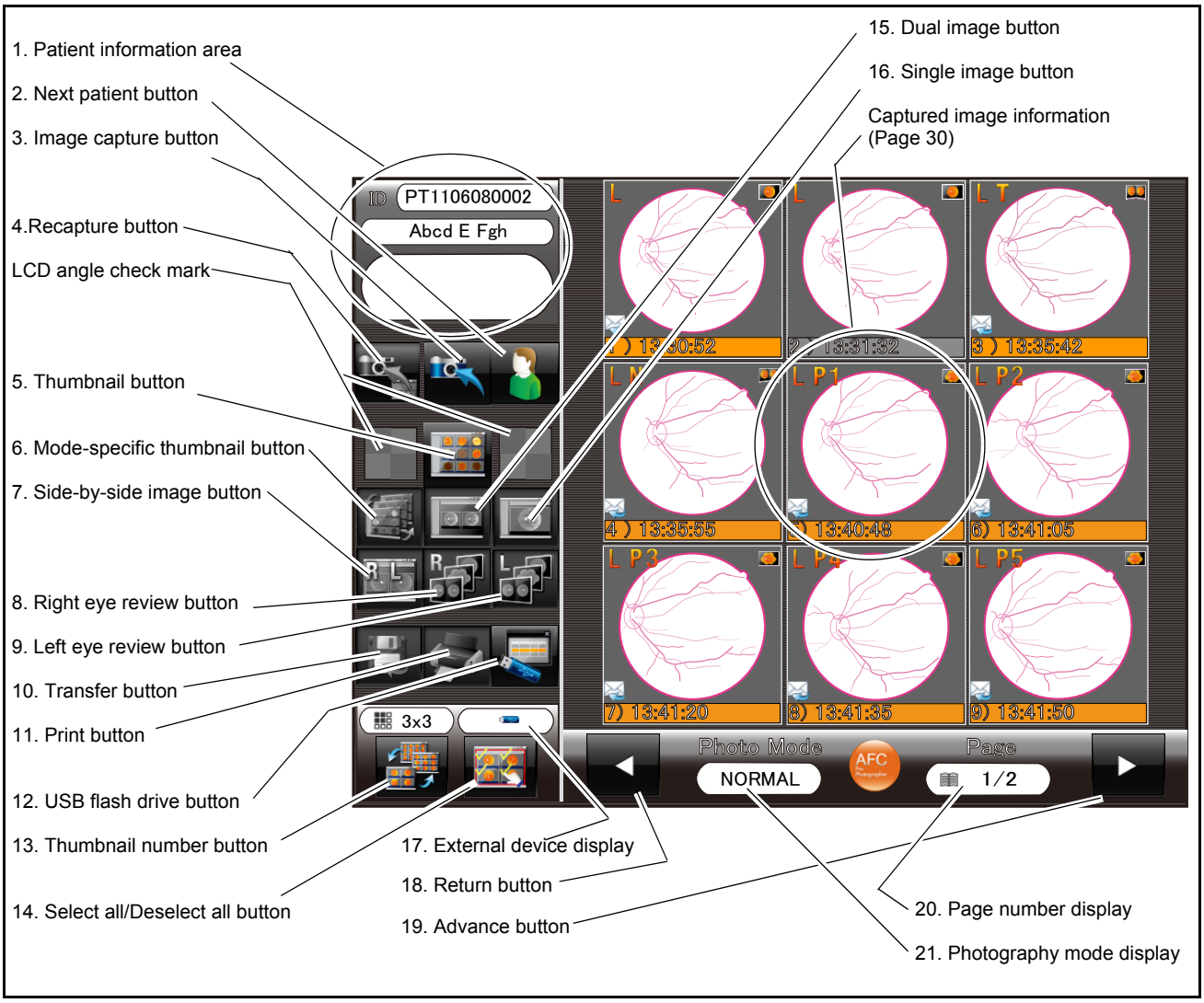
- A maximum of 50 images can be temporarily saved in the device. When an additional image is saved with 50 images saved in the device, the oldest image is deleted.

[Thumbnail screen]

Displays thumbnails of captured images for a patient.

Note

- Although the images displayed as thumbnails are temporarily saved in the device even when the device power is turned off, save necessary images in a USB flash drive using the transfer button before turning off the device power.



1. Patient information area

Shows the ID, name, and comments of the patient of the captured image.

2. Next patient button 

Used to display the anterior eye observation screen without selecting any patient.

When the Patient ID quick registration function is set to ON, a new patient ID is automatically acquired, and the alignment screen for that patient is displayed.

3. Image capture button 

When this button is pressed, the anterior eye observation screen appears in the same photography mode as used for the latest image capture.

4. Recapture button 

Used to display the anterior eye observation screen with the same image capture conditions as used for the image being selected with the thumbnail (same eye [left eye if the selected image is left eye] in same photography mode).

Note

- If the selected image is for the left eye and the image capturing unit is positioned toward the right eye when the recapture button is pressed, a message appears to instruct the operator to switch the eye. In such a case, be sure to reposition the unit.

5. Thumbnail button 

Used to display thumbnails of captured images.

6. Mode-specific thumbnail button 

Used to display thumbnails of images captured in the same photography mode as used for the selected image.

7. Side-by-side image button 

Used to display the partner eye of the selected image side by side when there are both right and left eye images captured in the same photography mode.

If either the right or left eye image has not been captured, this button is displayed in black and white and disabled.

8. Right eye review button 

Used to display right eye images captured in the same photography mode as used for the selected image.

When there is no right eye image, this button is displayed in black and white and disabled.

9. Left eye review button 

Used to display left eye images captured in the same photography mode as used for the selected image.

When there is no left eye image, this button is displayed in black and white and disabled.

10. Transfer button 

Used to transfer images of the selected thumbnail to the connected external storage device such as a USB flash drive.

However, if the “Transfer to” setting is set to OFF in the External settings screen (see “〇 Transfer” (Page 121) in 2.9.3), this button is black and white and disabled.

Note

- The format of the data to be transferred to the specified destination can be selected depending on the type of the storage device that is being connected. (see ”〇 Transfer” (Page 121).)

11. Print button 

Used to print the image being selected or reviewed when a printer is connected to the device.

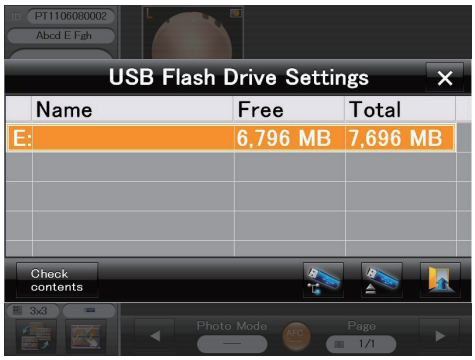
For details of connection or use, see “○ Printer” (Page 129) and “3.1.2 Connection, disconnection, and use of printer” (Page 143).

When purchasing a printer, contact NIDEK or your authorized distributor.

12. USB flash drive button 

Used to display the USB Flash Drive Settings screen. The screen allows switching or disconnection of the USB flash drive, and checking of presence or absence of image files saved in the USB flash drive.

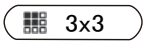
For details, see “3.1.1 Connection, disconnection, and use of USB flash drive” (Page 140).



USB Flash Drive Settings screen

13. Thumbnail number button 

Used to select the number of thumbnails to be displayed in the screen. Each pressing of this button changes the number as follows: 3×3 → 4×4 → 2×2 → 3×3.

The number is displayed above the button as 

.

14. Select all/Deselect all button 

Used to select all thumbnails of the current patient. Pressing the button again cancels the selection.

Selected thumbnails are framed in green.

Pressing this button when any images are selected cancels selection of these images. Pressing this button again after that selects all images.

15. Dual image button 

Used to display two large images when two thumbnails are selected.

16. Single image button 

Used to display a large image when only one thumbnail is selected.

17. External device display

Shows the icon of external devices connected to the device.

: Displayed when a USB flash drive is connected.

: Displayed when a PC is connected to the device via a LAN.

: Displayed when a printer is connected to the device.

: Displayed when a USB flash drive and a printer are connected to the device.

: Displayed when a PC and a printer are connected to the device.

: Nothing is displayed when none of a USB flash drive, a PC, and a printer is connected to the device.

Note

- Even if a USB flash drive or a PC is connected to the device, the icon is not displayed unless it is specified as the destination of image transfer. For details, see “O Transfer” (Page 121) in 2.9.3.

18. Return button ◄

Used to go back a page when there are multiple thumbnails.

Rotating the joystick counterclockwise executes the same action.

19. Advance button ►

Used to advance a page when there are multiple thumbnails.

Rotating the joystick clockwise executes the same action.

Note

- When multiple images are captured, the ◄ and ► buttons in the review screen become image scroll buttons. When there are multiple image capture positions (in Panorama or Stereo photography), pressing these buttons without selecting any image scrolls all the images, and pressing these buttons with any images selected scrolls only the selected images. Images can be scrolled also rotating the joystick clockwise or counterclockwise.

20. Page number display

Shows the current page number and the total number of pages when there are multiple thumbnails.

Example) 1/3 (Current page)/(Total pages)

21. Photography mode display

Shows the name of the photography mode being selected.

The photography mode name is displayed only when captured images are viewed using the following buttons:

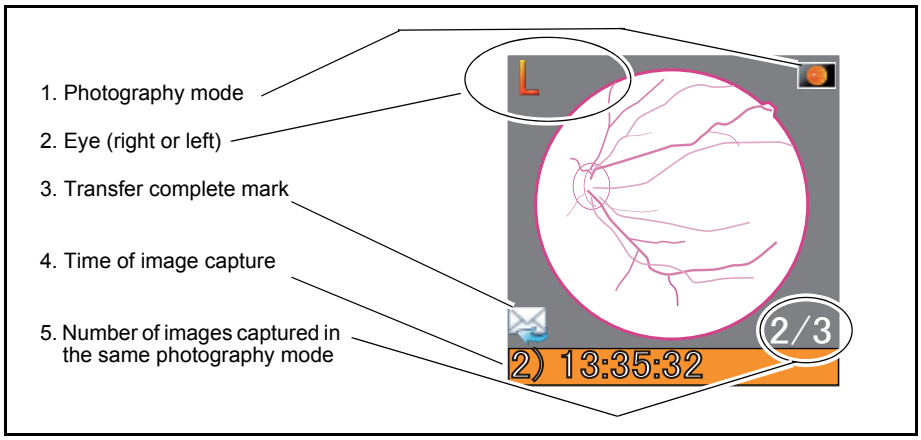
- **Mode-specific thumbnail button**
- **Side-by-side image button**
- **Right eye review button**
- **Left eye review button**

Note

- When the peripheral area of the page number display or the photography mode display is pressed, these displays and the return and advance buttons disappear, and only the captured images are displayed. The disappeared displays reappear by pressing the same area again.

[Captured image information]

In the thumbnail or review screen, information of images such as whether the eye is the right eye or the left eye is shown.



1. Photography mode

Shows the photography mode used for the image with an icon.

 : Normal photography mode  : Stereo photography mode

 : Panorama photography mode  : Anterior eye photography mode

2. Eye (right or left)

Shows whether the eye is the right eye or the left eye. In Stereo photography mode or Panorama Photography mode, additional information is shown.

Example

(1) L: Left eye image captured in Normal or Anterior eye photography mode (“OS” can be displayed instead of “L”.)

(2) L N: Nasal side image of the left eye captured in Stereo Photography mode (When “T” is displayed instead of “N”, the image is of the temporal side.)

(3) L P2: Left eye image captured when the second internal fixation lamp was used in Panorama photography mode

3. Transfer complete mark 

Indicates that the image has been transferred to an external storage device such as a USB flash drive.

When this mark is not displayed, the image has not been transferred.

4. Time of image capture

Shows the order and time of image capture for the selected patient. The background color shows whether the image is OK or not.

Example: 2) 13: 35: 32

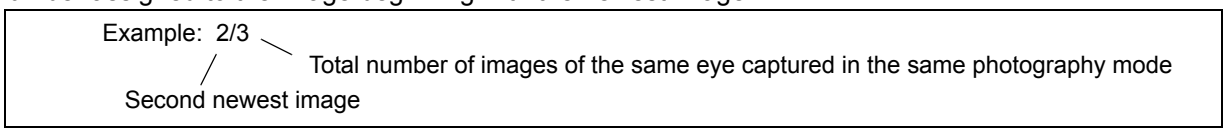
Index (2nd image) Time of image capture

Background: Orange.....The OK/Auto transfer button or the OK button was pressed in the preview screen.

Gray.....Retry button was pressed in the preview screen. (Transferring the image in the review screen changes the background color to orange.)

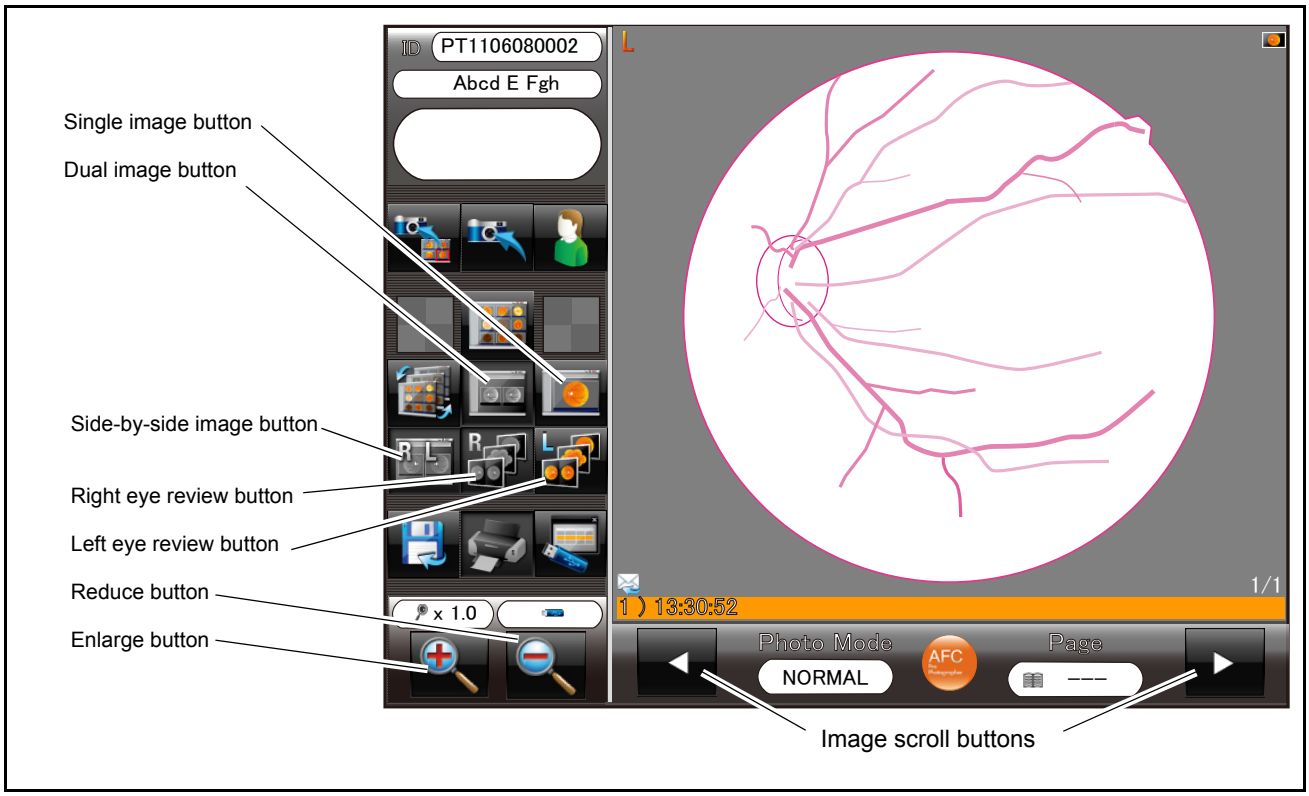
5. Number of images captured in the same photography mode

Shows the total number of images of the same eye captured in the same photography mode, and the image number assigned to the image beginning with the newest image.



[Review screen]

Displays the captured image immediately after image capture.



In the review screen, the same buttons and information are displayed as in the thumbnail screen.

Note

- When multiple images are captured, the ◄ and ► buttons become image scroll buttons. When there are multiple image capture positions (in Panorama or Stereo photography), pressing these buttons without selecting any image scrolls all the images, and pressing these buttons with any images selected scrolls only the selected images. Images can be scrolled also rotating the joystick clockwise or counterclockwise.

A similar screen is displayed when a single or multiple images selected with thumbnails are displayed with the buttons shown below.

In the single image display, the reduce and enlarge buttons appear at the bottom left of the screen.

Side-by-side image button 

Right eye review button 

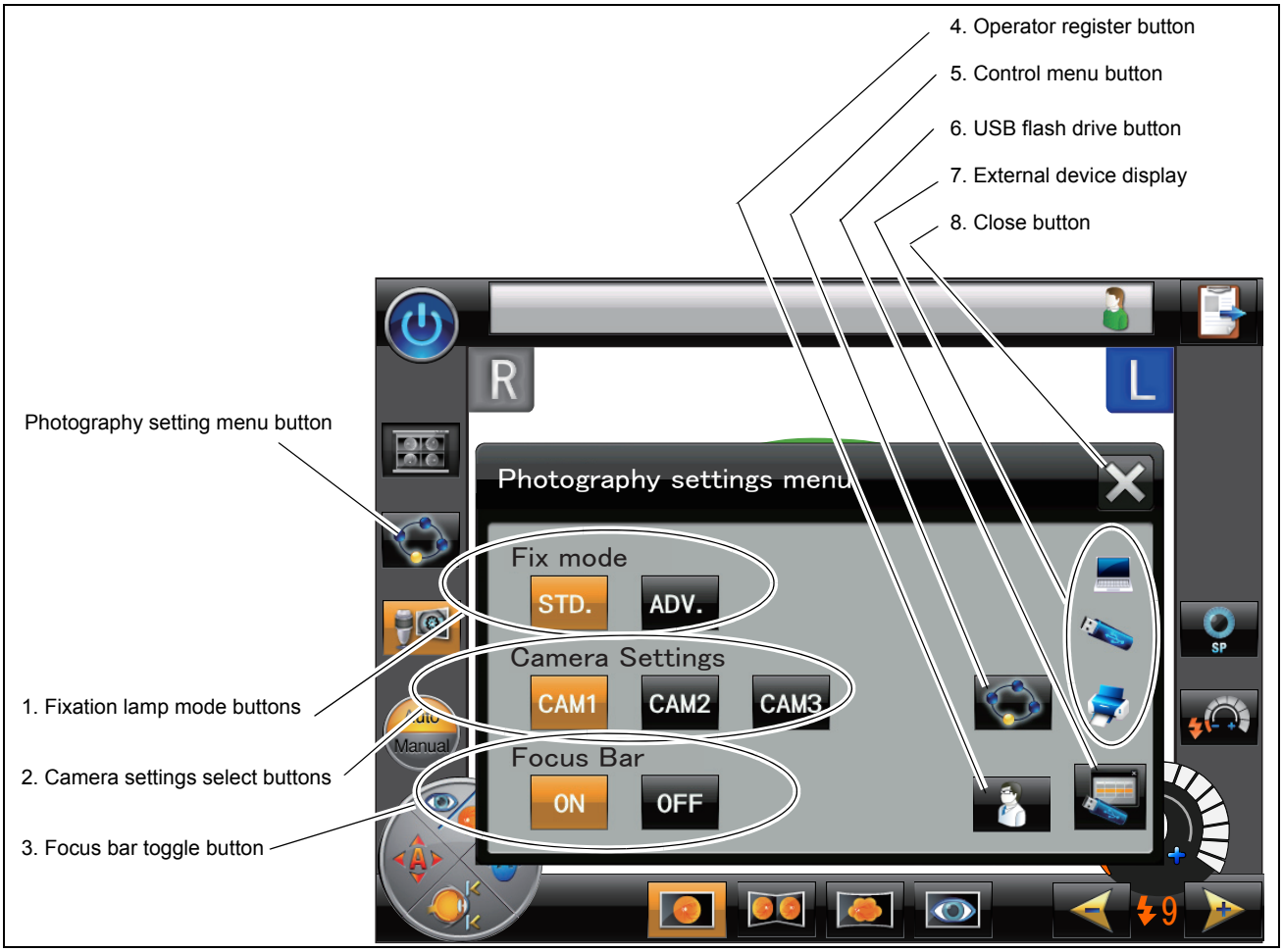
Left eye review button 

Dual image button 

Single image button 

[Photography settings menu]

When the photography setting menu button  is pressed, the Photography settings menu screen appears.



1. Fixation lamp mode buttons

Used to select the desired fixation lamp mode. The selected button becomes orange, and others become black and white.

STD. Standard—Standard setting of fixation lamp (default)

The positions of the preset three internal fixation lamps cannot be changed.

ADV. Advance—Seven internal fixation lamps

The positions of the preset seven internal fixation lamps cannot be changed.

Pano Panorama—This button appears on the side of the “ADV.” button when the Photography settings menu screen is opened in Panorama photography mode. Two to nine internal fixation lamps can be selected in “○ Pan. fixation lamps” (Page 116).

EXT. This button appears on the side of the “ADV.” button when the Photography settings menu screen is opened with the external fixation lamp unit (optional) connected to the external fixation lamp connector. Pressing this button illuminates the external fixation lamp in red.

In Panorama photography mode, this button does not appear even when the external fixation lamp unit is connected.

2. Camera settings select buttons

A maximum of three image capture conditions can be preset and saved as “CAM1”, “CAM2”, and “CAM3” for later use.

CAM1 , CAM2 , CAM3 : Default is CAM1.

For setting of each button, see “〇 CAM1, CAM2, CAM3” (Page 117).

These buttons do not appear and cannot be used in Low-light photography mode.

3. Focus bar toggle button

Used to select whether to remove the focus bar on which to project the focus split from the fundus observation screen.

ON : The focus bar is displayed in the fundus observation screen. (Default)

OFF : The focus bar is removed from the fundus observation screen. The auto focus is disabled because the focus split is not projected.

4. Operator register button 

Displayed when the “Operator’s info entry” setting is set to “ON” in the “Main unit settings—Software settings” screen of “Control menu”. (See “〇 Software settings” (Page 108).)

The default setting is “OFF” and this button is not displayed.

When the operator’s ID is registered, the ID is added to the information to be printed.

To register an operator, press this button to display the screen for registering operators. Then press the blank ID and input the operator’s ID using the keyboard in the screen.

5. Control menu button 

Used to open the Control menu screen that allows various settings.

The appearance of this button is the same as the photography setting menu button.

6. USB flash drive button 

Used to switch, connect, or disconnect the USB flash drive for the device, or to open the USB Flash Drive Settings screen to check the presence or absence of image files saved in the USB flash drive.

For details, see “3.1.1 Connection, disconnection, and use of USB flash drive” (Page 140).

7. External device display

Shows external devices connected to the device as icons.

 : Displayed when a USB flash drive is connected to the device.

This mark disappears when all USB flash drives are disconnected.

This mark does not appear even if any USB flash drive is connected to the device unless USB flash drive is not specified as the image transfer destination (see “〇 Transfer” (Page 121) in 2.9.3). Even in this case, the USB Flash Drive Settings screen can be opened with the USB flash drive button.

 : Displayed when a PC is connected to the device via a LAN.

This mark does not appear when the LAN is disconnected or PC is not specified as the image transfer destination (see “〇 Transfer” (Page 121) in 2.9.3).

: Displayed when a printer is connected to the device.

When the printer is disconnected, this mark is not displayed.

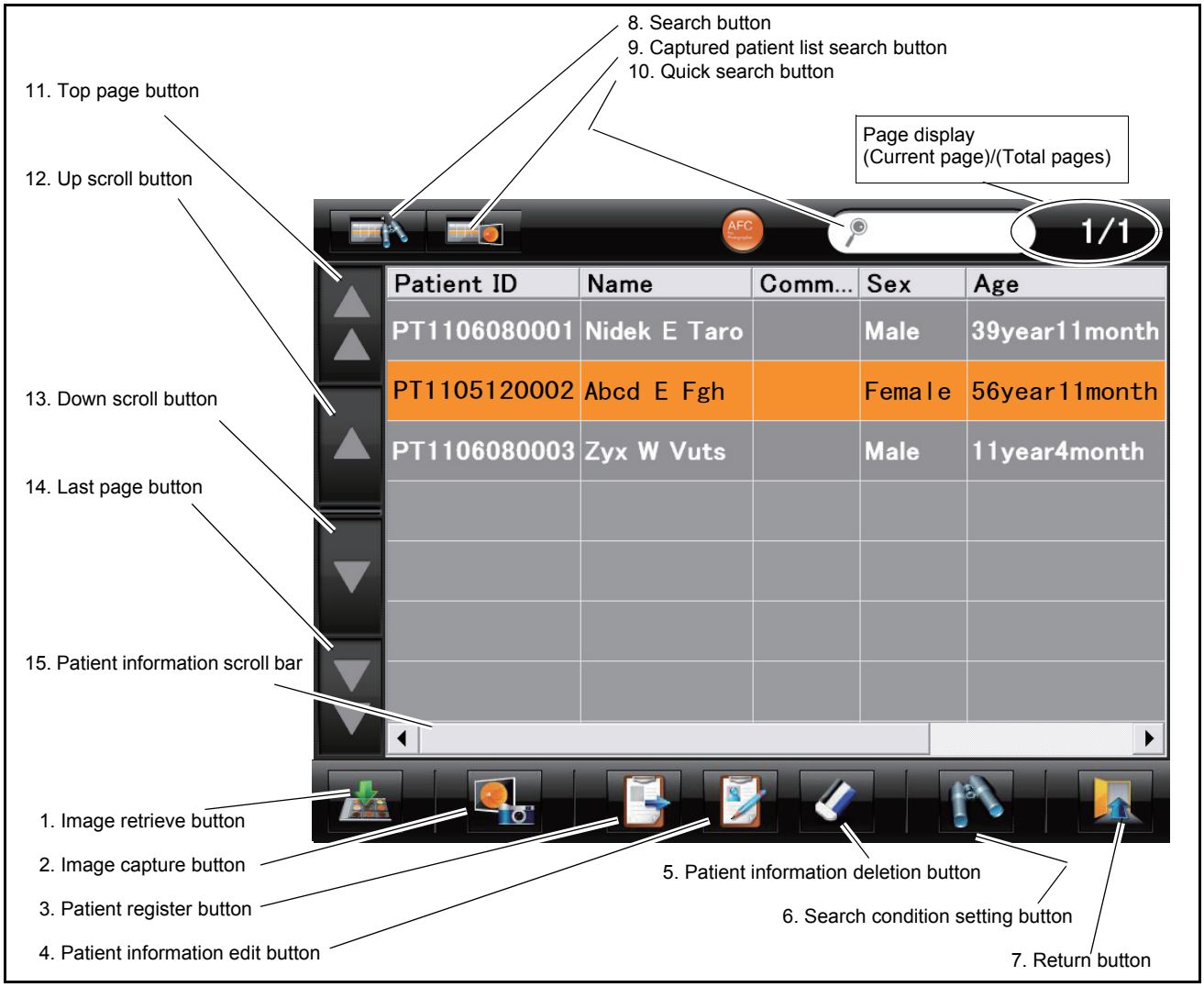
8. Close button 

Used to close the Photography settings menu screen.

[Patient information register screen]

Pressing the patient list button  displays the screen shown below.

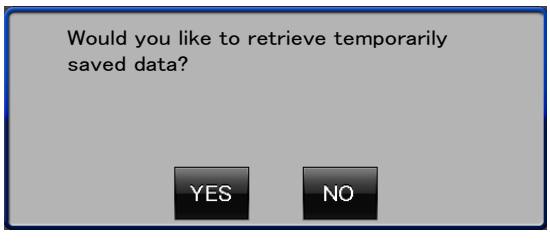
(When the Patient ID quick registration function is set to ON, the button changes to .)



1. Image retrieve button  **:**

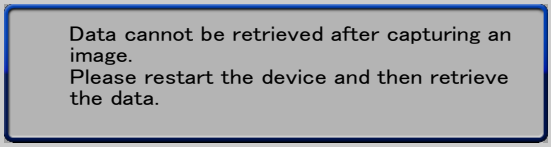
Used to restore temporarily saved data of the selected patient.

Pressing the button displays the message shown to the right.



Note

- Once any image was captured, past patient data cannot be restored unless the device is restarted. Pressing the button after image capture displays the message below.



2. Image capture button :

Pressing this button after selecting a patient displays the anterior eye observation screen for alignment and image capture.

3. Patient register button :

Used to register a new patient. Pressing this button displays the patient information register screen.

4. Patient information edit button :

Used to edit registered patient information. Pressing this button after selecting a patient displays the patient information register screen. If the device is connected to a LAN (to NIDEK image filing software, NAVIS-EX), the button is disabled.

5. Patient information deletion button :

Depending on the method of pressing the button, it can be selected whether to delete only the selected patient information or to delete all the patient information.

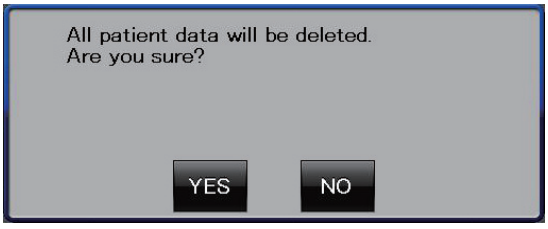
Clicking (pressing for about 0.5 second or less) deletes only the selected patient information.

Extended pressing (pressing for about 3 seconds) deletes all the patient information in the patient information register screen.

For details, see “O Deleting patient information” (Page 92).



Clicking of the patient information deletion button



Extended pressing of the patient information deletion button

6. Search condition setting button :

Used to search the desired patient. Pressing this button displays the search condition setting screen.

7. Return button  **:**

Used to display the anterior eye observation screen for the patient (shown in orange) selected in the patient information register screen.

8. Search button  **:**

This button is shown in orange when the list of patients searched using the search condition setting button  is displayed in the patient information register screen. Pressing this button in this condition returns to the patient information register screen before the search (with no search condition), and returns the color of the button to black. Each pressing of this button toggles use of the input search condition. (When the quick search is being executed, data as specified with the search condition setting button is searched from the search result of the quick search.)

9. Captured patient list search button  **:**

Used to search patients for whom image capture has been performed on the current day. Each pressing of the button toggles the contents of the patient information register screen between the current day image capture patient list and the all patient list.

10. Quick search button  **:**

Pressing this button displays a keyboard for quick search.

When the quick search result is displayed, the search condition is displayed in the button.

Patients whose following information contains the input numerical and alphabetical characters are searched: patient ID, name, medical history, and comments.

A maximum of ten single byte characters can be input.

Note

- Despite being searchable items may not appear in the search if they are set to not be displayed in the “Main unit settings—Patient list” screen.
- Among the patients not selected in the patient information register screen, those who have had image capture performed on the current day are shown in darker gray than the other patients.

11. Top page button  **:**

Used to move to the top page if the patient list is shown in multiple pages.

12. Up scroll button  **:**

Used to advance a page if the patient list is shown in multiple pages.

13. Down scroll button  **:**

Used to go back a page if the patient list is shown in multiple pages.

14. Last page button  **:**

Used to move to the last page if the patient list is shown in multiple pages.

15. Patient information scroll bar:

Moving the scroll bar right and left shows the entire patient information that cannot be shown in a single screen.

Note

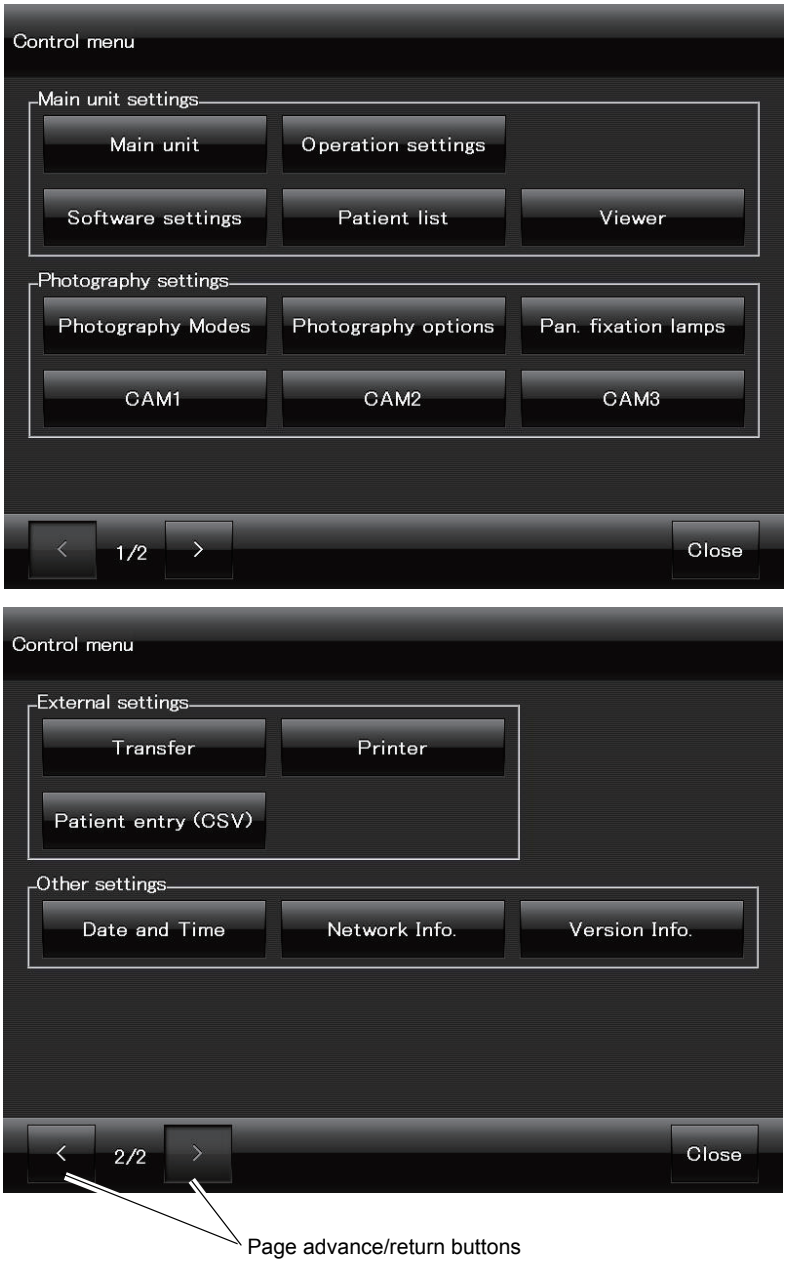
- Among the patients not selected in the patient information register screen, those who have had image capture performed on the current day are shown in darker gray than the other patients.

[Control menu]

Pressing the Control menu button  in the Photography setting menu screen displays the Control menu screen. The menu is on two pages.

Page 1/2: Main unit settings—For operation and display on the main unit
Photography settings—For image capture conditions
Page 2/2: External settings—For external device
Other settings—For clock and version information
For details, see “2.9 Control Menu” (Page 104).

[Control menu]

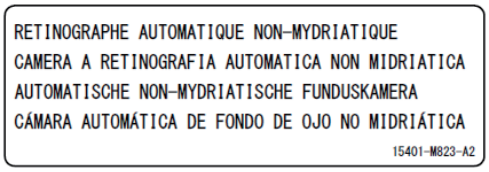


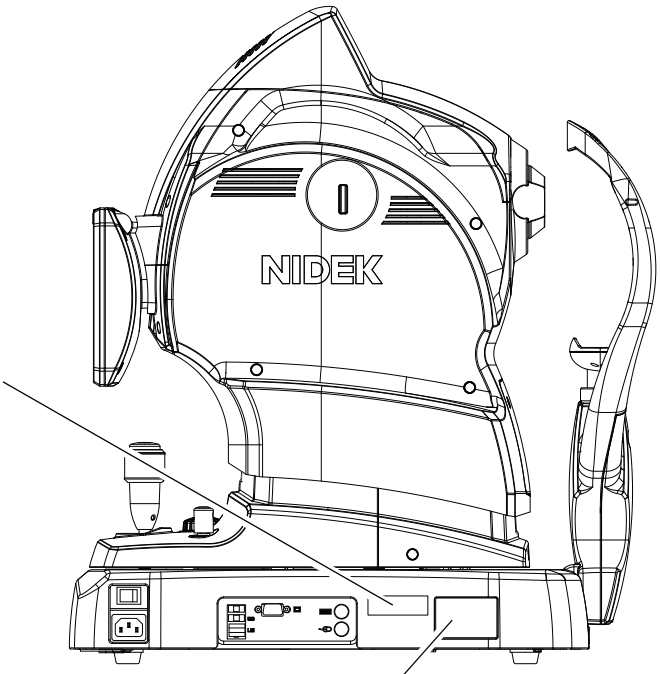
1.6 Labels and Symbols

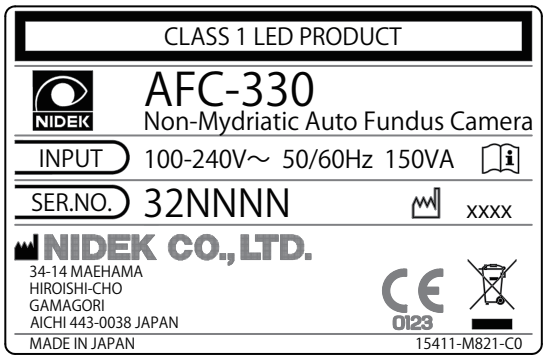
To call attention to users, labels and indications are provided on the device. If labels are peeling off, characters are fading, or otherwise becoming illegible, contact NIDEK or your authorized distributor.

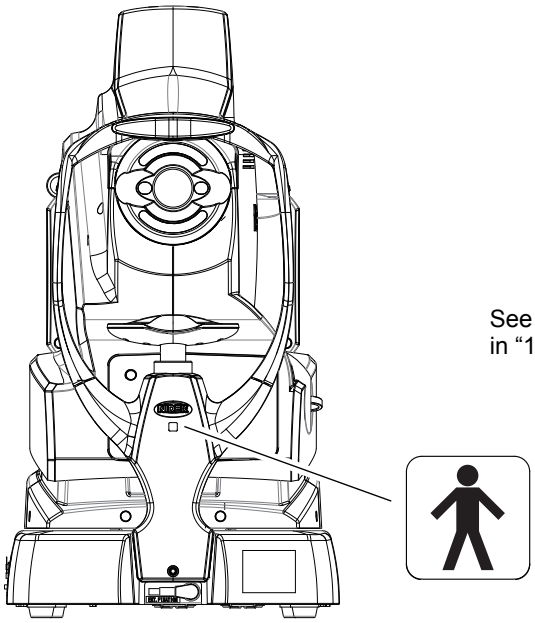
	Indicates that the operator is advised to refer to the related instructions in the operator's manual.
	Indicates that caution needs to be taken.
	Indicates that the degree of protection against electric shock is of a Type B Applied Part. • Chinrest • Forehead rest * The applied parts are the chinrest and the forehead rest (see 8. Forehead rest and 11. Chinrest in "1.4 Device Configuration" (Page 3).
	Indicates the state of the power switch. If this symbol side of the switch is pressed down, power is not supplied to the device.
	Indicates the state of the power switch. If this symbol side of the switch is pressed down, power is supplied to the device.
	Indicates that the device must be supplied only with alternating current.
	Indicates the date of manufacture.
	Indicates the manufacturer.
	Indicates that this product shall be disposed of in a separate collection of electrical and electronic equipment in EU.
	Indicates the observation illumination intensity knob used to adjust the light intensity for fundus observation.
USB	Indicates the USB connector.
LAN	Indicates the connector for connection to Ethernet.
	Indicates the VGA connector. Not used for this device.
	Indicates the keyboard connector. Not used for this device.
	Indicates the mouse connector. Not used for this device.
EXT. FIXATION	Indicates the connector for the external fixation lamp.

○ For countries other than Canada





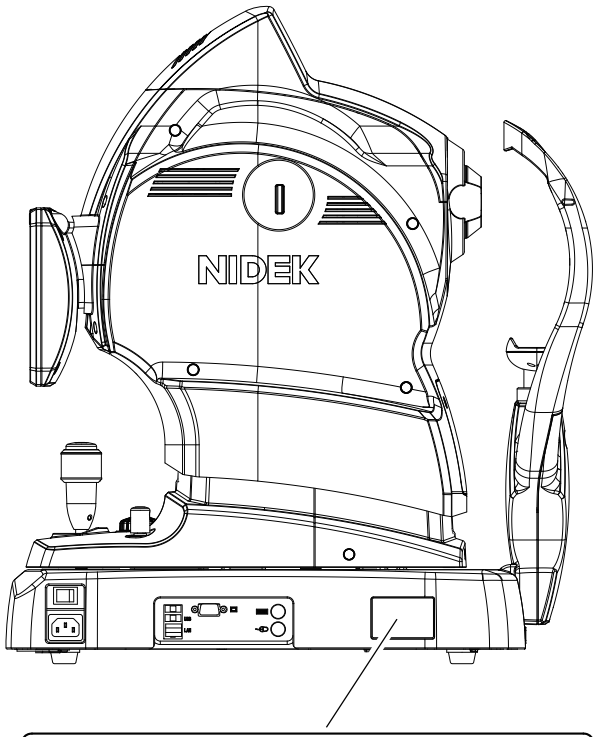


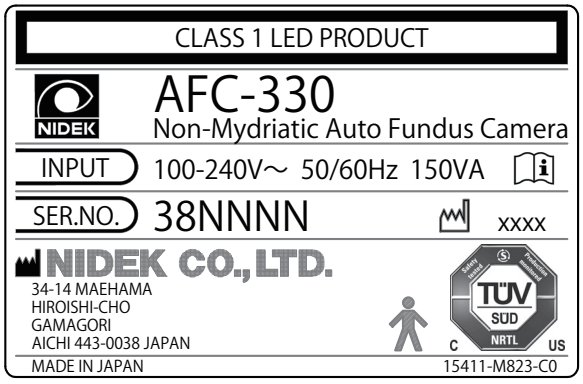


See “Before Use” (Page II), and the precaution of Step 6 (Page 47) in “1.8 Device and Software Setup” (Page 46).

CE 0123	CE marking Indicates that the product conforms fully to the requirements of the Medical Device Directive (93/42/EEC). The AFC-330 is classified as a Class IIa according to the Medical Device Directive.

○ For Canada

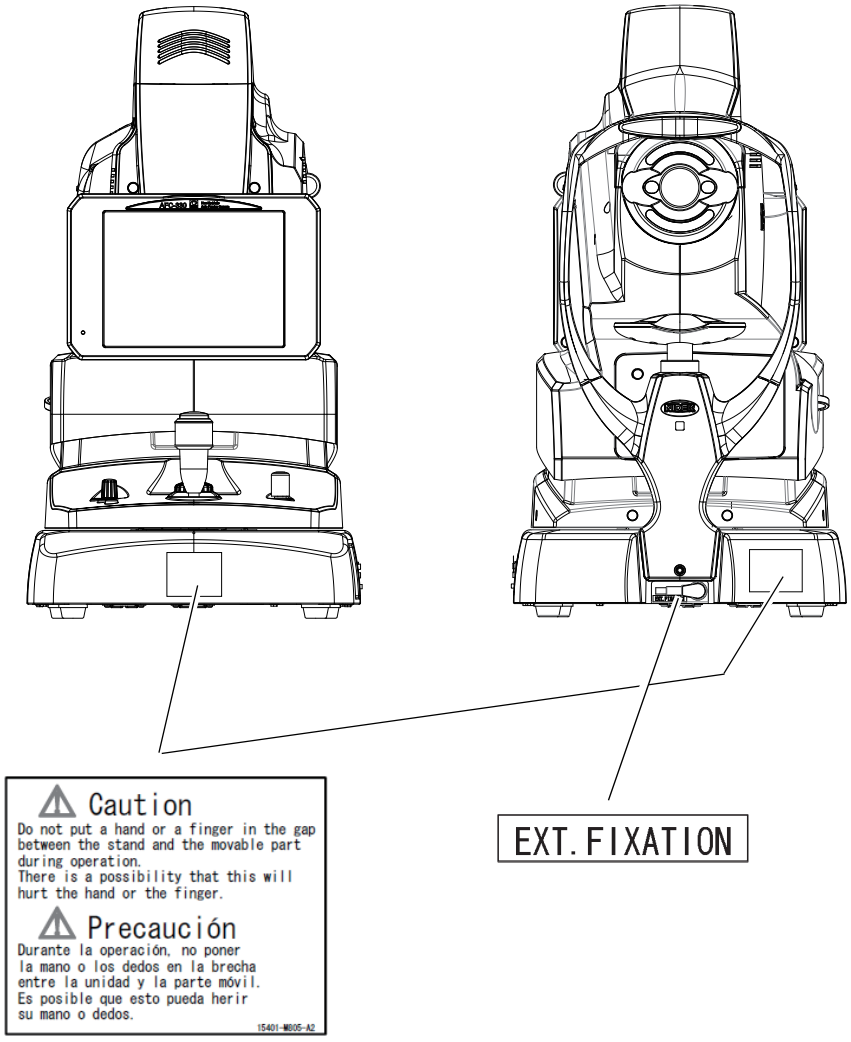




See “Before Use” (Page II), and the precaution of Step 6 (Page 47) in “1.8 Device and Software Setup” (Page 46).

	Indicates that the product is certified for the Canadian market, to the applicable Canadian standards.

○ Common



See “Before Use” (Page II).

1.7 Packed Contents

Remove the contents from the shipping carton, then check the contents.

The following standard accessories are contained:

- AFC-330 main body
- Power cord
- Dust cover
- Chin rest paper
- Chinrest paper pins
- Objective lens cap
- Cap holder
- Spacer for anterior eye image capture
- Blower
- Operators's manual
- Quick reference guide
- NAVIS-EX license

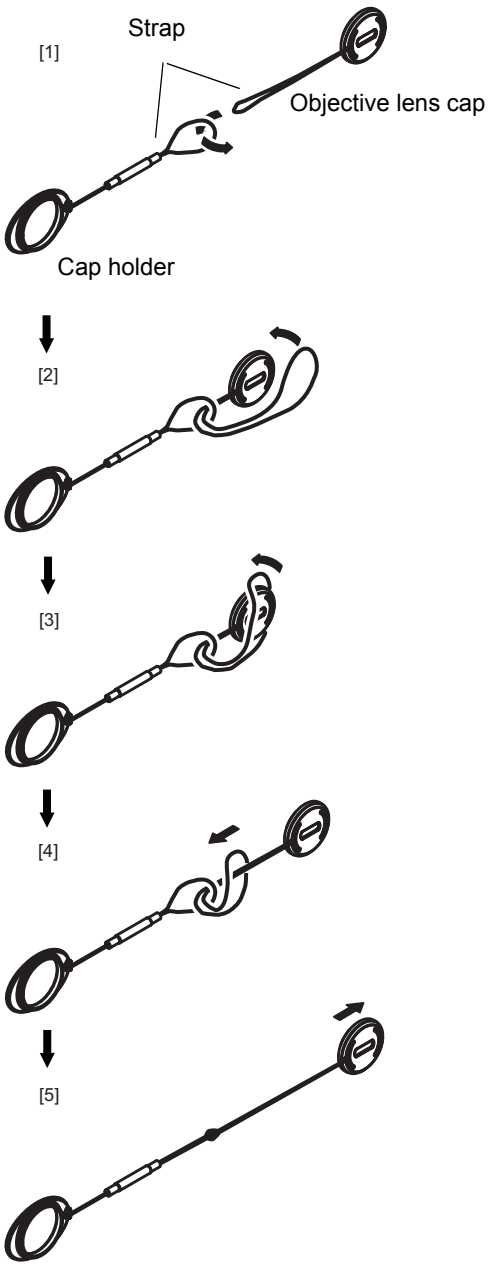
1.8 Device and Software Setup

Install the device in a place in accordance with the precautions in “Before Use”.
The procedure below is explained with a USB flash drive connected to the device, which is the default setting for the device.
When using the USB flash drive, observe the instructions in “3.1 Connection of USB devices” (Page 139).
When using the device in connection with the PC through a LAN, also see “3.2 Connection of PC” (Page 144).

1 Install the device on a stable place.

2 Attach the cap holder according to the procedure below.

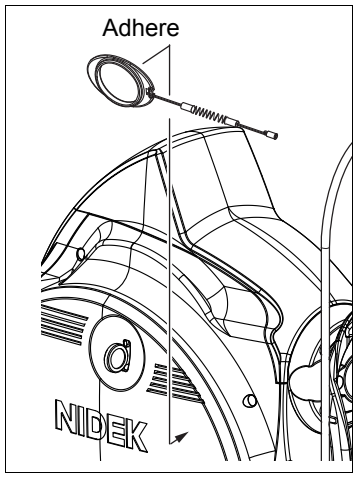
1) Tie the straps on the cap holder and the objective lens cap as shown to the right.



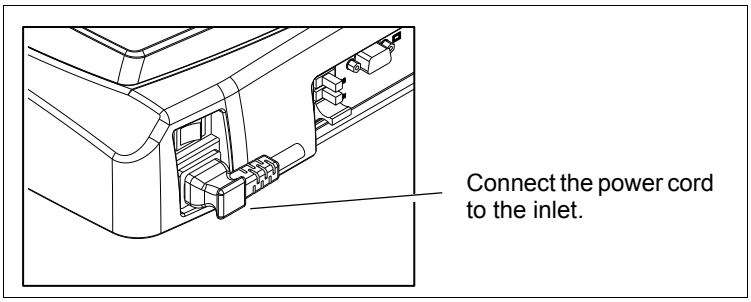
2) Adhere the cap holder on a appropriate place such as a side of the device.

 The cap holder is adhesive-backed. Adhere it after removing the paper backing.

 Place the objective lens cap on the objective lens when the device is not used, or on the cap holder when the device is used.



3 Connect the power cord to the inlet of the device.



4 Connect a USB flash drive to the USB connector.

⚠ **CAUTION**

- **Each time before connecting a USB flash drive to the device, be sure to check it for viruses.**

 If the device is infected with a virus and any problem occurs, NIDEK does not assume responsibility or compensate for damages.

- **When connecting the USB flash drive to the device, be sure to perform the procedure described in "3.1.1 Connection, disconnection, and use of USB flash drive" (Page 140), or with power to the device turned off.**

 Failure to do so may corrupt the data in the USB flash drive or cause the device to malfunction.

5 If necessary, connect the cables for external devices such as a printer.

6 Confirm that power to the device is turned off (◯). Plug the power cord to the power outlet.

⚠ **WARNING**

- **Be sure to use a grounded power outlet.**

 Electric shock or fire may result in the event of malfunction or power leakage.

⚠ **CAUTION**

- **Be sure to supply power to external devices through an isolation transformer.**

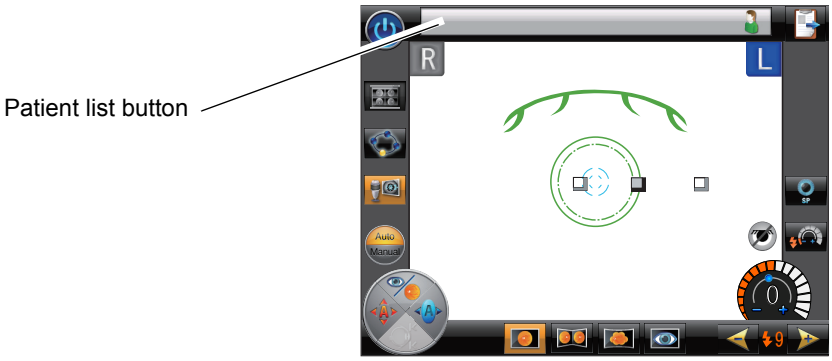
7 Turn on (|) power to the device.

The initial screen is displayed and the device is initialized.

Wait (for about 45 seconds) until the initial screen changes to the anterior eye observation screen.



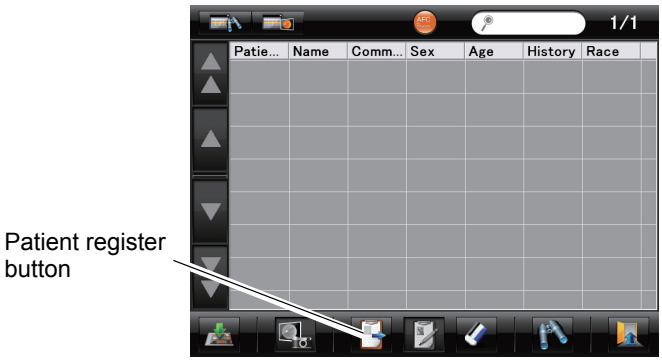
The anterior eye observation screen is displayed.



Anterior eye observation screen

8 Press the patient list button  in the anterior eye observation screen.

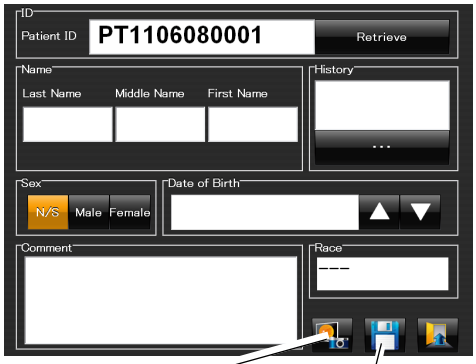
The patient information register screen is displayed.



Patient information register screen

9 Press the patient register button  at the bottom of the patient information register screen.

The new patient register screen is displayed.



New patient register screen

10 Input the patient information in the new patient register screen.

Patient ID, Name, Sex, Date of birth, History (medical history), Race, Comments

The ID is automatically assigned and appears in the Patient ID box. (Auto patient ID)

(For the setting of auto patient ID, see "○ Operation settings" (Page 106).)

If the device is LAN-connected (to NIDEK Image filing software NAVIS-EX) and patient information registration with a CSV file are enabled, the patient ID is not automatically assigned. Even in such a case, the patient ID must be input. Without the patient ID, image capture is not allowed.

For the method of inputting the information, see "○ Registering patients" (Page 86).

After inputting patient information, there are two ways to proceed to image capture.

1. Press the save button . Then proceed to Step 11 and 12.

 Proceeding to image capture after returning to the patient information register screen

2. Press the Image capture button . Then proceed to Step 12.

 Proceeding to image capture by displaying the anterior eye observation screen at the same time as registration of patient information

11 Press the save button .

The patient information register screen is displayed with the input patient.

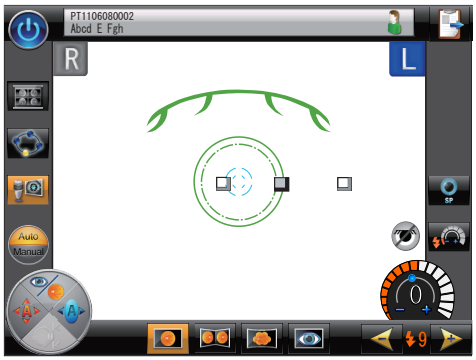
Pressing the row of the registered patient highlights the row in orange.

When only one patient is registered, the row of that patient is automatically selected and highlighted.



12 Press the image capture button .

The anterior eye observation screen is displayed for image capture.



Preparation for image capture is complete.

○ Reference pages for the desired operation

Desired operation	Reference page
Capturing fundus images when the patient's pupil is small	“2.5.4 Small pupil photography mode” (Page 76)
Stereo photography	“2.5.1 Stereo photography mode” (Page 70)
Panorama photography	“2.5.2 Panorama photography mode” (Page 72)
Capturing images of the anterior eye instead of the fundus	“2.5.3 Anterior eye photography mode” (Page 74)
Continuous image capture while preventing contraction of the patient's pupil as much as possible	“2.5.5 Low-light photography mode” (Page 79)
Smooth image capture of eyes with frequent blinking	“2.6.2 Auto shot” (Page 80) “○ Photography options” (Page 113)
Selection of image capture positions while observing the fundus	
Changing the setting for the internal fixation lamp	“2.8.1 Fixation lamp mode” (Page 101)
Cleaning the objective lens	“4.3 Cleaning Objective Lens” (Page 155)

○ Reference pages for the desired device function specified by parameters

Various parameters enable or disable various functions of the device.

Desired device function	Reference page for parameter
Setting image quality and camera sensitivity	“2.8.2 Camera setting” (Page 103) “○ CAM1, CAM2, CAM3” (Page 117)
Flash intensity after startup of the device	“○ Photography options” (Page 113)
Displaying or not displaying the split indicator	
Changing items of patient information	“○ Patient list” (Page 109)
Changing items of printing with a connected printer	“○ Printer” (Page 129)
Changing the idle time before entering Sleep mode	“○ Main unit settings” (Page 105)
Changing the beep volume	
Automatic initialization of the chinrest height at the device startup or when the patient is changed	
Changing the brightness of the LCD touch-screen	
Changing the intensity of the hand light	
Changing the display format of right and left eyes (R/L or OD/OS)	
Displaying or not displaying the anterior eye monitor in the fundus observation screen (for observation of the anterior eye)	

2. OPERATING PROCEDURE

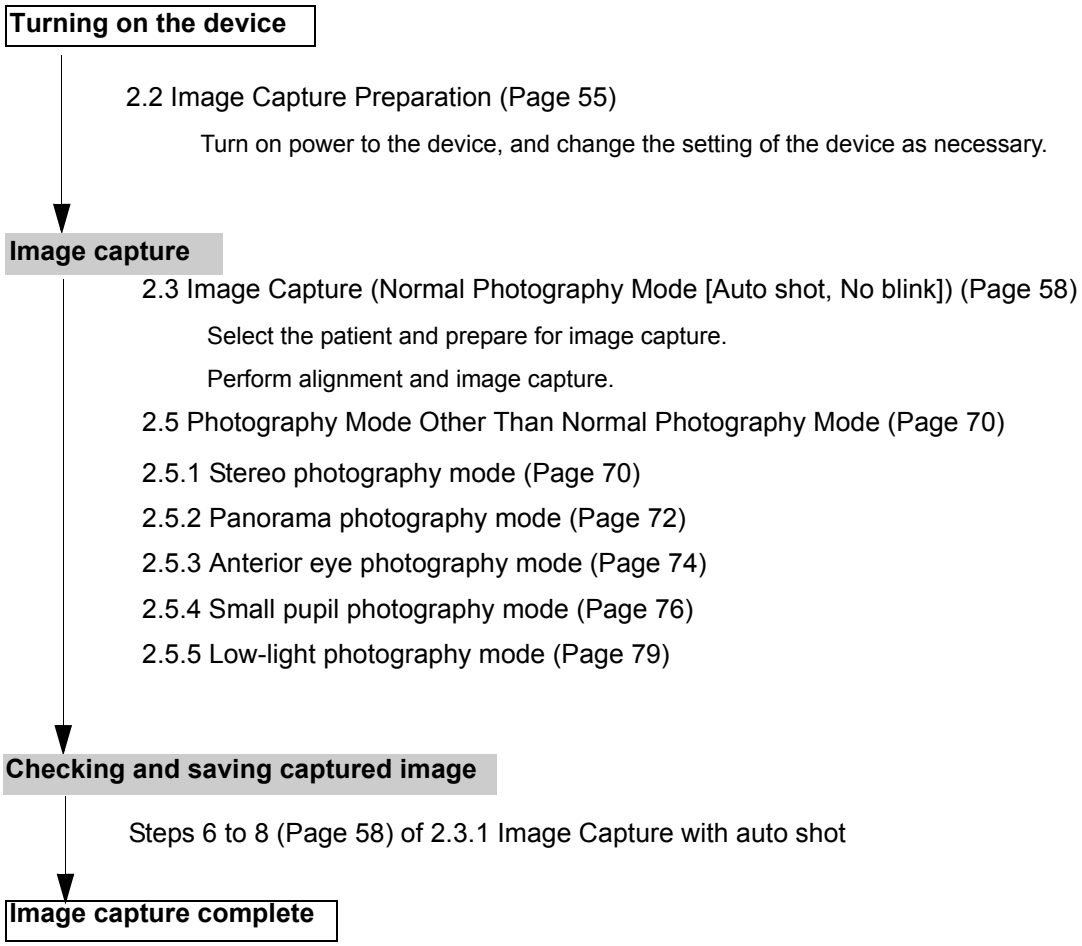
2.1 Operation Overview

The device can be used with a USB flash drive connected for storing captured images. The device may also be connected with a personal computer (PC) via a LAN or directly to the network of the medical facility via a LAN for storing and managing captured images. Management of the captured images may be conducted using the NIDEK image filing software (such as NAVIS-EX) or a specific folder in a PC.
When a printer is connected to the USB port, captured images can be directly printed without using a PC.

* NAVIS-EX is optional software.
* Refer to the operator's manual of the software such as NAVIS-EX for details.

The operation procedure is explained for the condition in which a USB flash drive is connected to the device.

○ Standard image capture procedure



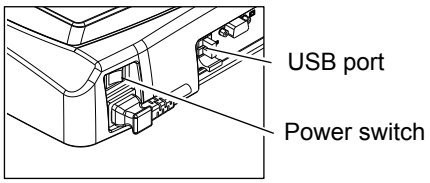
2.4 Image Capture Shutdown Procedure (Page 67)

2.2 Image Capture Preparation

This is the daily preparation procedure for the device with a USB flash drive connected to it, which is the default setting for the device.
When using the USB flash drive, observe the instructions in "3.1 Connection of USB devices" (Page 139).
When using the device in connection with the PC through a LAN, also see "3.2 Connection of PC" (Page 144).

1 Connect the USB flash drive to the USB port.

Confirm that the USB flash drive is connected securely to the USB port.



After starting the device, connection of the USB flash drive can be confirmed on the LCD touch-screen. (See "3.1.1 Connection, disconnection, and use of USB flash drive" (Page 140).)

⚠CAUTION

- **Each time before connecting a USB flash drive to the device, be sure to check it for viruses.**

 If the device is infected with any viruses and any problem occurs, NIDEK does not assume responsibility or compensate for damages.

- **When connecting the USB flash drive to the device, be sure to perform the procedure described in "3.1.1 Connection, disconnection, and use of USB flash drive" (Page 140), or with power to the device turned off.**

 Failure to do so may corrupt the data in the USB flash drive or cause the device to malfunction.

- **When restarting the device, turn on power to it at least three seconds after turning power off.**

 If the power switch is turned on immediately after turning it off, the device may malfunction.

2 Turn on power to the device.

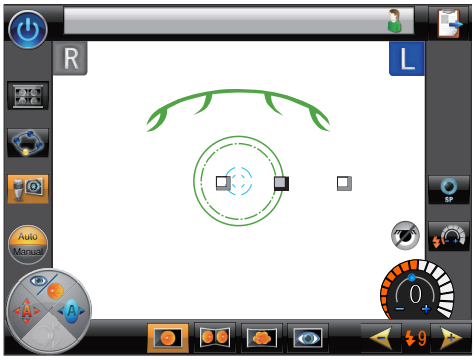
The initial screen appears on the LCD touch-screen. Initialization of the device is started.

Wait (for about 45 seconds) until the initial screen changes to the anterior eye observation screen.

When power to the device is turned on, the main unit makes slight movement in all directions to determine the initial position for the auto tracking. It is not a failure of the device.

The anterior eye observation screen.

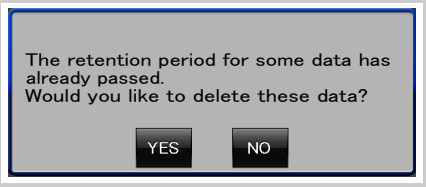




Anterior eye observation screen

Note

- The message shown below may appear when the anterior eye observation screen is activated. Select YES or NO as necessary to clear the message.



When "YES" is selected, the patient information register screen is displayed and deletion of data from the list is started.

While data is being deleted, an indicator appears.

Depending on the number of patients whose data is to be deleted, the data deletion may take long.

For details of setting of the retention period of patient data, see "O Software settings" (Page 108).

3 Remove the cap from the objective lens and check the lens for cleanliness.

Attach the removed objective lens cap to the cap holder.

If the objective lens is not clean, clean the lens. An unclean objective lens affects image capture considerably.

After starting the device, observe the patient's eye under visible light (halogen lamp) with the infrared filter inside the device removed by pulling the infrared filter lever.

For details, see "4.3 Cleaning Objective Lens" (Page 155).

If the objective lens is even slightly soiled, image capture may be affected.

4 Perform preoperation check of the device.

Perform the checks below prior to operation of the device.

- ☐ The main unit can be moved smoothly forward, backward, to the left and right using the joystick.
- ☐ The image capturing unit can be moved up and down by the joystick.
- ☐ The chinrest can be moved up and down by the chinrest up/down buttons.
- ☐ The main unit can be locked and unlocked by the locking knob.
- ☐ The device can be started properly.
- ☐ Settings can be performed by the switches and buttons on the operation panel and LCD touch-screen.
- ☐ Image capture can be performed properly.
 - Input an arbitrary ID, then check that image capture can be executed with flash.

2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])

Image capture is performed after selecting the desired patient from the patient information register screen.
In non-mydriatic photography, the patient's pupil needs to be dilated in a darkened place (a light level at which a newspaper can barely be read).
The operating procedure below is explained in Normal photography mode using the auto shot without the blink detector and without auto switching to Small pupil photography mode that is the default setting.

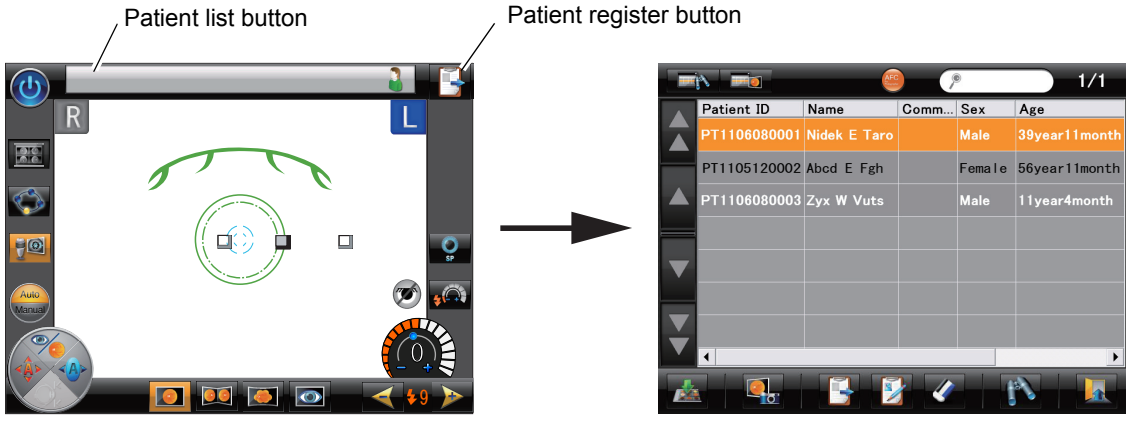
2.3.1 Image Capture with auto shot

Image capture with Auto 

selected with the Auto/Manual toggle button

1 Press the patient list button in the anterior eye observation screen.

The patient information register screen appears.

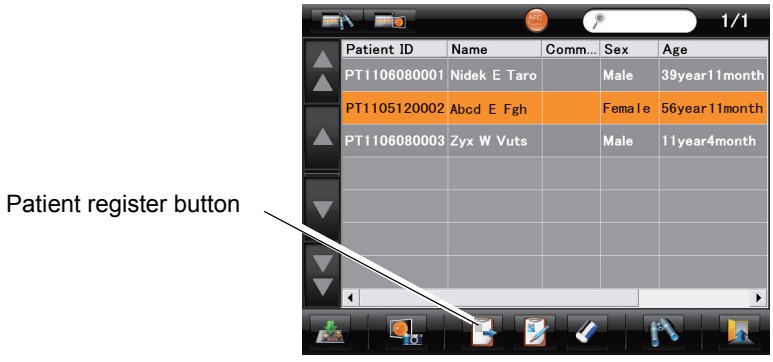


Anterior eye observation screen

Patient information register screen

2 Press the desired patient for whom images are to be captured.

The row of the selected patient is highlighted in orange.



If the name of the desired patient is not in the list, press the patient register button  at the bottom of the patient information register screen or at the top right of the anterior eye observation screen. (For details, see “O Registering patients” (Page 86).)

In this explanation, images are captured for a registered patient.

3 Press the image capture button .

The anterior eye observation screen for the selected patient appears.

4 Prepare the patient for image capture.

1) If the patient is wearing contact lenses, instruct them to remove them.
2) Have the patient seat themselves in the chair in front of the device.
3) Clean the parts that come into contact with the patient (chinrest and forehead rest).

 Use a gauze or absorbent cotton swab dampened with rubbing alcohol.

 If chinrest papers are used, remove a sheet after each patient.
4) Have the patient rest their chin on the chinrest and their forehead on the forehead rest securely.

 If the patient is not in a comfortable posture, adjust the height of the table and chair.
5) Inform the patient that the chinrest is going to be moved up and down, then adjust the chinrest height by the chinrest up/down buttons so that the patient’s eyes are roughly level with the eye level marker.
6) Instruct the patient to gaze at a green blinking light in the device when it becomes visible.
7) Instruct the patient to open both of their eyes wide during image capture.

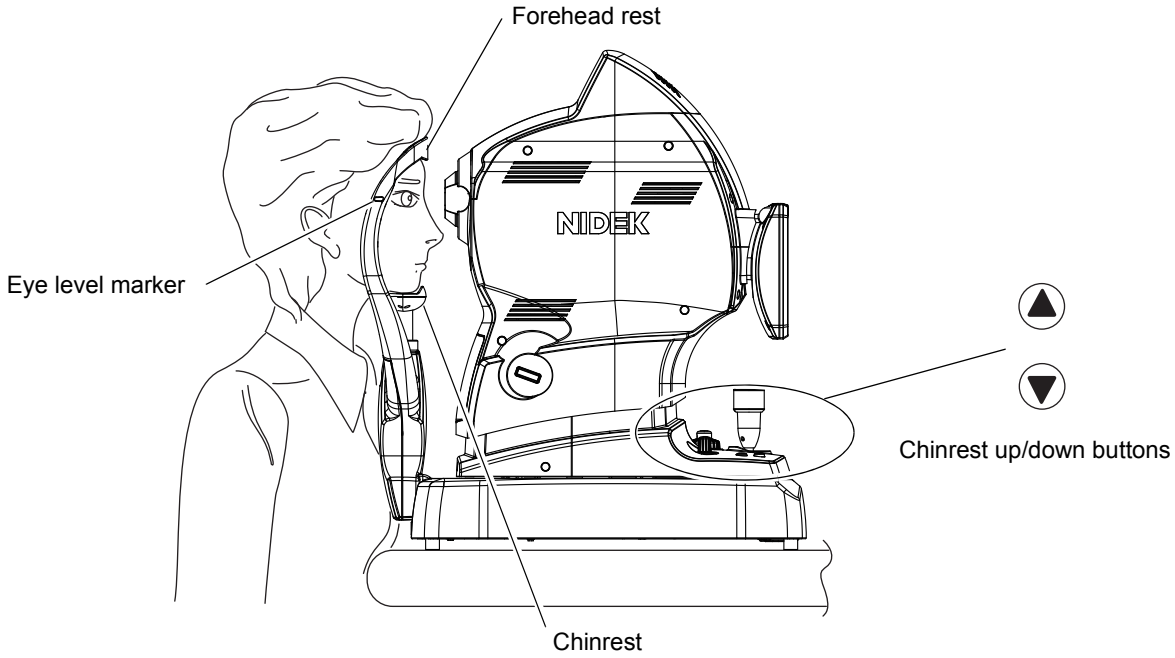
 If one eye is closed, proper eye fixation cannot be achieved, and the other eye cannot be opened wide enough.
8) Instruct the patient not to blink during image capture.

Note

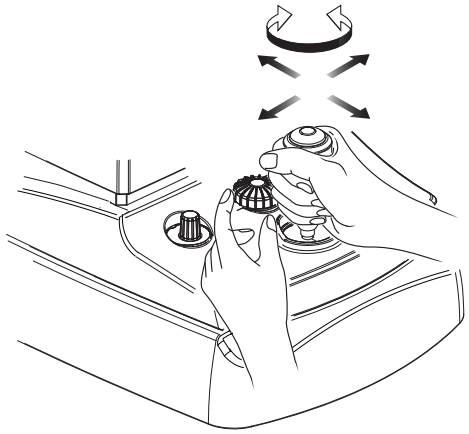
- If eye fixation is difficult (for reasons such as inability to see the internal fixation lamp), use the external fixation lamp, and instruct the patient to look at the blinking external fixation lamp with the other eye.
- If eye fixation cannot be achieved with either the internal or external fixation lamps, instruct the patient where to look until fixation is achieved.

 Example—“Look straight. Slowly move your eyes to the right.”
- If it is difficult for the patient to keep their eyes opened without blinking, use the auto shot with the blink detector. For details, see “2.6.2 Auto shot” (Page 80).

 Doing so not only helps the patient, but also facilitates image capture.



5 Perform alignment using the joystick so that the patient's anterior eye is displayed on the LCD touch-screen.



6 Make the (eight) cornea-reflected spots appear.

When the eight cornea-reflected spots are detected, the alignment automatically proceeds as described below.

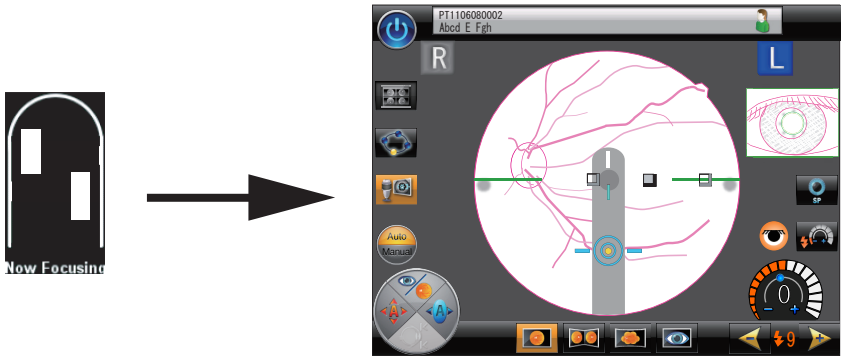
* Here, the internal fixation lamp is in the center of the "STD." setting.
 To change the internal fixation lamp position, see "2.8.1 Fixation lamp mode" (Page 101).
* These cornea-reflected spots may not be detected depending on the condition of the patient's eye, and the auto tracking may not be activated. (See " Auto tracking cannot be executed." (Page 148) in "4.1 Troubleshooting" (Page 147).) In such a case, alignment needs to be performed manually. (See Steps 3 to 5 in "2.3.2 Image Capture without automatic functions" (Page 65).)

1) The electronic working dot is displayed, and the auto tracking in the up, down, forward, backward, left, and right directions is activated.
2) The anterior eye is displayed in the center of the screen (the electronic working dot is aligned to the center of the target mark).
3) The working distance indicator is reduced to a single line and the alignment is completed.

* If the auto tracking stops before the alignment is completed (with the vertical, left and right, or forward and backward movement limit indicator displayed), see "○ If auto tracking stops before the alignment is complete" (Page 63).



4) When the alignment is complete, the auto focus icon appears, then the fundus observation screen is automatically displayed.



5) When the proper focus on the fundus is achieved by the auto focus, the message "Capturing the image." appears, then image capture is automatically executed with flash.

* If the auto focus does not activate, see "○ If auto focus is not activated" (Page 64).

6) After the icons below appeared in the image processing screen, the preview screen displays the captured fundus image.

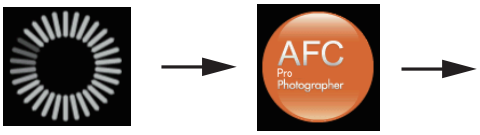
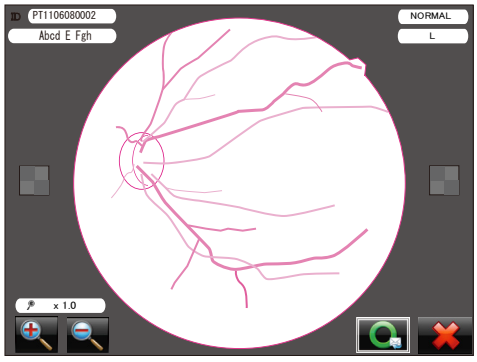


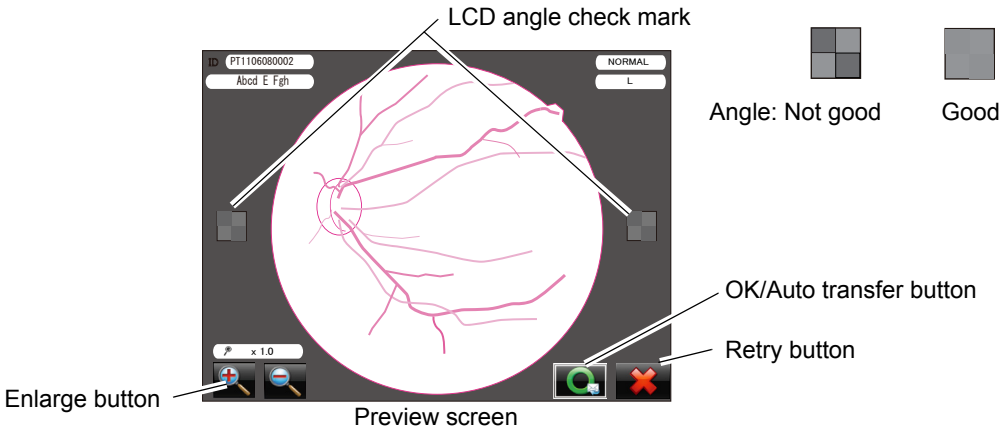
Image processing screen



Preview screen

7 Check the captured image from a position at which neither of the LCD angle check marks on both sides of the preview screen are seen as a checkered pattern ().

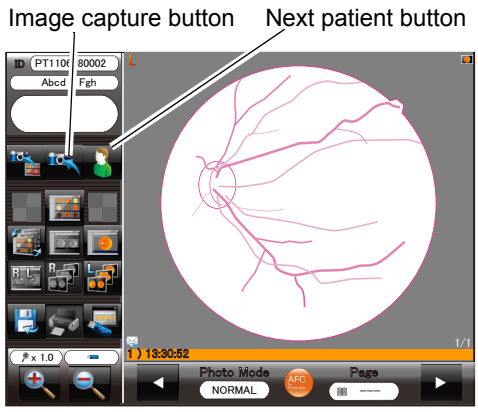
A captured image can be enlarged with the enlarge button . Touching a desired part of the enlarged image brings that part to the center of the screen.



8 To save the image, press the OK/Auto transfer button . To discard the image and perform image capture again, press the retry button .

The same action can be executed by rotating the joystick counterclockwise or clockwise , then pressing the release button.

1) When the OK/Auto transfer button is pressed, the captured image is saved in the USB flash drive, and the review screen is displayed.
2) If the image is dark or too bright when performing image capture again, adjust the flash intensity using the flash intensity up/down buttons.



9 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then perform the procedure from Step 3.

Note

- In the review screen after image capture of one eye, the eye can be switched by the operation below.

 Press the release button or the image capture button in the review screen. Then the anterior eye observation screen for the other eye is displayed.

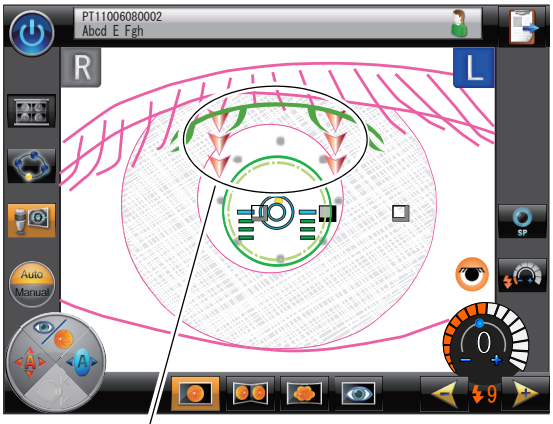
10 To perform image capture of the next patient, press the next patient button to display the anterior eye observation screen, then perform the procedure from Step 1.

11 When image capture is complete, proceed to “2.4 Image Capture Shutdown Procedure” (Page 67).

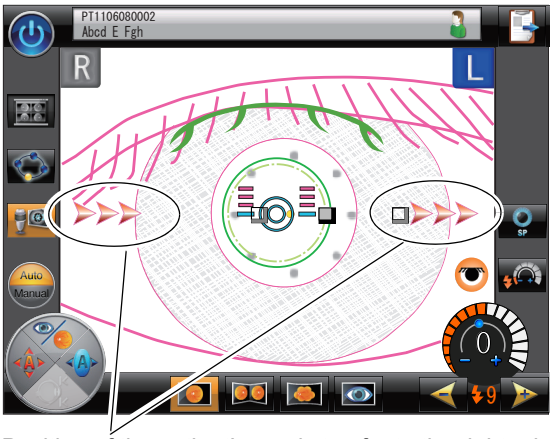
○ If auto tracking stops before the alignment is complete

<If the auto tracking in the up, down, left, and right directions stops before the anterior eye is displayed in the center of the screen>

The vertical movement limit indicator and the right and left movement limit indicator appear. Operate the chinrest up/down buttons and joystick in accordance with the indicators.



Position of the patient's eye is too high relative to that of the image capturing unit. Lower the chinrest.



Position of the patient's eye is too far to the right relative to that of the image capturing unit. Move the image capturing unit by tilting the joystick.


: Lower the chinrest.


: Raise the chinrest.


: Tilt the joystick a little to the right.

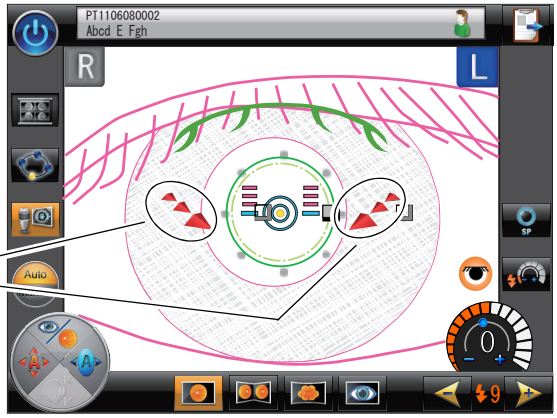

: Tilt the joystick a little to the left.

<If auto tracking in the forward and backward directions stops before the alignment is complete>

The forward and backward movement limit indicator appears. Operate the joystick in accordance with the indicators.

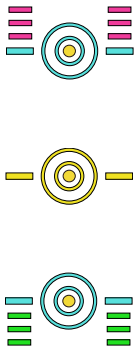

: Tilt the joystick a little backward.


: Tilt the joystick a little forward.



Forward and backward movement limit indicator

For the joystick movement amount, see the working distance indicator.



Too close to the patient's eye
Pull the joystick to move the image capturing unit away from the patient's eye.

The alignment is optimum.

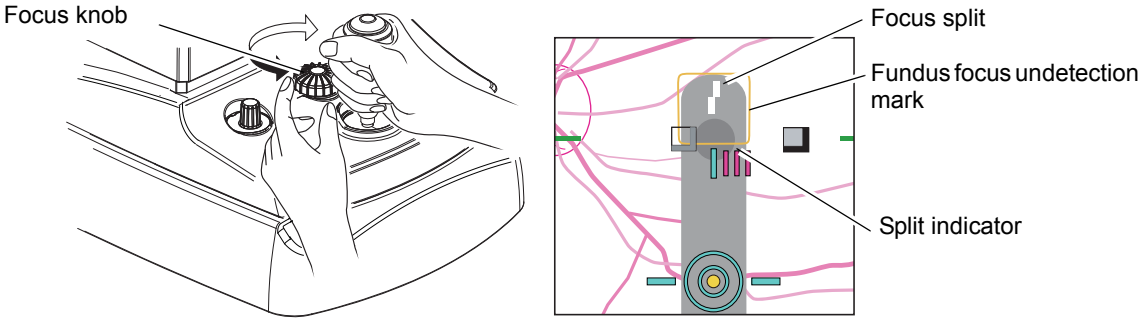
Too far from the patient's eye
Move the joystick toward the patient to move the image capturing unit closer to the patient's eye.

○ If auto focus is not activated

If the fundus focus undetection mark* is displayed, the focus may not be adjusted to the fundus properly. Adjust the focus using the focus knob.

* The fundus focus undetection mark disappears after blinking six times. (See " 4. Fundus focus undetection mark" (Page 22).)

Adjust the focus using the focus knob so that the upper and lower lines of the focus split form a single line, or that only a single line of the split indicator is displayed.



Note

- The auto focus may not be activated for certain eyes such as those with cataract, or severe myopia or hyperopia that causes refractive error outside the range between -12 D and +15 D.

 In such a case, insert a minus compensation lens for severe myopia and a plus compensation lens for severe hyperopia using the compensation lens select lever, then adjust the focus using the focus knob.

 When a compensation lens is inserted, the focus split and the split indicator are not displayed. So the operator needs to adjust the focus using the focus knob while observing the focus condition in the screen.

- Be sure to stop the compensation lens select lever at the position where a click is felt.

 If not, the right or left side of the image becomes dark and proper images cannot be captured.

2.3.2 Image Capture without automatic functions

Image capture with Manual 

selected with the Auto/Manual toggle button
All the auto functions are disabled.
Because the auto shot is disabled, the eyelid and eyelashes mark  is not displayed.

1 Perform Steps 1 to 4 of “2.3.1 Image Capture with auto shot” (Page 58).

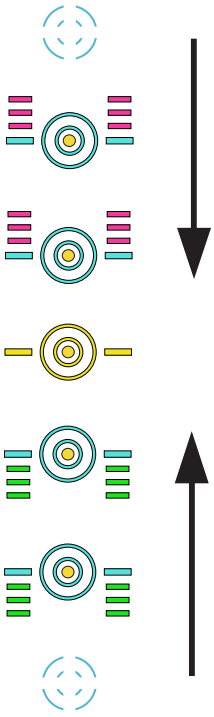
2 Make the (eight) cornea-reflected spots reflected from the cornea appear.

When the eight cornea-reflected spots are detected, the electronic working dot appears.

3 When the electronic working dot appears, perform alignment in the up, down, right, and left directions using the joystick so that the electronic working dot is adjusted to the center of the target mark.

* If the electronic working dot does not appear (with the required pupil diameter detection mark displayed as  due to failure to detect the cornea-reflected spots), perform alignment so that the circle formed by the cornea-reflected spots and the required pupil diameter mark become concentric.

4 Perform the forward and backward alignment using the joystick so that only a single line of the indicator is displayed.



When the target mark appears like this, the cornea-reflected spots are not detected. The same indication appears for vertical and horizontal misalignment.

Too close to the patient’s eye

Move the joystick back to move the image capturing unit away from the patient’s eye.

The alignment is optimum.
The indicator is displayed in yellow (not in the fundus observation screen).

Move the joystick forward to move the image capturing unit closer to the patient’s eye.

Too far from the patient’s eye

When the target mark appears like this, the cornea-reflected spots are not detected.

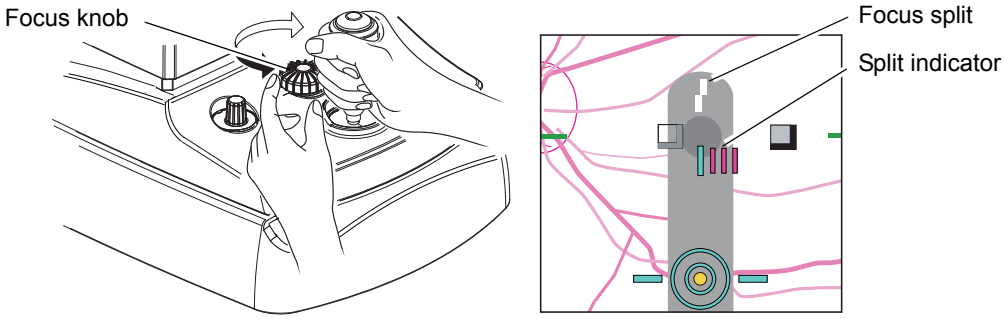
For the joystick movement amount, see the working distance indicator and the target mark.

* If the electronic working dot does not appear, the working distance indicator does not appear even if proper alignment is achieved.

 In such a case, perform alignment in the forward and backward directions so that the cornea-reflected spots can be seen most clearly.

5 When proper alignment is achieved, press the anterior eye/fundus observation toggle button to display the fundus observation screen.

6 Adjust the focus using the focus knob so that the upper and lower lines of the focus split form a single line, or that only a single line of the split indicator is displayed.



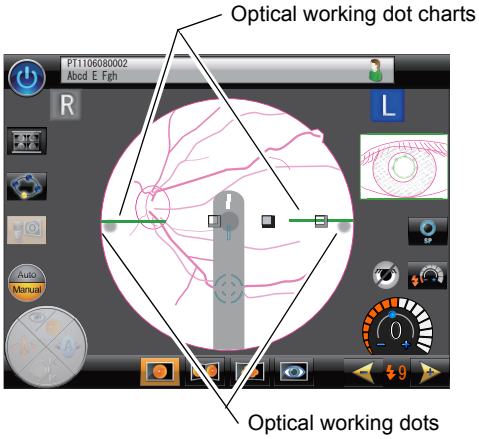
* If the electronic working dot does not appear (with the required pupil diameter detection mark displayed as  due to failure to detect the cornea-reflected spots), perform alignment so that the optical working dots are displayed in the screen as shown below. Adjust the focus using the focus knob so that the upper and lower lines of the focus split form a single line.

 Up, down, right, and left directions—

 The right and left optical working dots are at symmetrical positions on the optical working dot chart.

 Forward and backward directions—

 The optical working dot can be seen most clearly.



7 If the fundus observation screen is too dark or too bright, adjust the Observation Illumination Intensity knob.

8 Change the internal fixation lamp position with the internal fixation lamp mark so that the desired part of the eye is displayed.

For details of the fixation lamp, see “2.8.1 Fixation lamp mode” (Page 101).

9 Check the screen. If necessary, perform adjust the alignment and focus using the joystick and the focus knob.

10 Press the release button.

The captured image is displayed in the preview screen as 6) (Page 61) of Steps 6 in “2.3.1 Image Capture with auto shot”.

11 Perform Steps 7 (Page 62) to 10 of “2.3.1 Image Capture with auto shot”.

The manual image capture procedure is complete.

2.4 Image Capture Shutdown Procedure

2.4.1 Usual finishing of operation

⚠CAUTION

- **When turning off power to the device, do not turn off (◯) the power switch first. Be sure to follow the procedure described here.**

 If the power switch is turned off (◯) first without following this procedure, data or software in the device may become corrupted or the device may fail.

- **When a USB flash drive is used, be sure to remove it after performing the procedure described in "3.1.1 Connection, disconnection, and use of USB flash drive" (Page 140) or turning off power to the device.**

 Failure to do so may corrupt the data in the USB flash drive or cause the device to malfunction.

1 When the image capture and data saving procedures are complete, return to the anterior eye observation screen, then press the shutdown button .

The shut down confirmation message appears in the middle of the screen.

2 Press YES in the shutdown confirmation message.

The software shutdown screen appears.

When the software is shut down, the shutdown complete message appears.

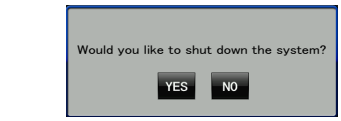
About 20 seconds are required until the shutdown complete message appears.

3 Turn off (◯) the power to the device.

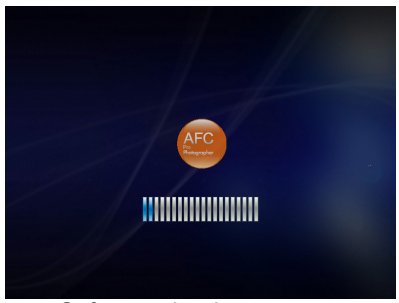
4 Attach the cap on the objective lens.

5 Clean all parts (such as the chinrest and forehead rest) that came into contact with the patients.

6 Place the dust cover on the device and store in clean conditions.

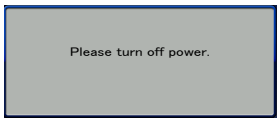


Shut down confirmation message



Software shutdown screen

About 20 seconds



Shut down complete message

2.4.2 Finishing operation in order to transport the device: Packing mode

When the device is to be transported, set the device ready to be packed (by setting the image capturing unit and chinrest to the positions specified for transport).
This device provides Packing mode which automatically sets the device ready to be packed.

⚠CAUTION

- **When the device is to be transported, set the device ready to be packed using Packing mode, and pack it in the specific packing material without locking the main unit using the locking knob.**
 The device may be damaged by vibration and bumping.

Two methods are available to set the device to Packing mode.
From "Control menu → Main unit settings → Main unit → Packing mode after shutdown", select ON or OFF.

●Setting device ready to be packed each time before transport

"Packing mode after shutdown": OFF (default setting)

●Setting device ready to be packed automatically when turning off the device power

"Packing mode after shutdown": ON

(For the setting of Packing mode, see "○ Main unit settings" (Page 105).)

○ Setting device ready to be packed each time before transport

This is the usual method.

1 Check that the infrared filter lever and the compensation lens select lever are fully inserted into the device.

2 After Step 5 of "2.4.1 Usual finishing of operation" (Page 67), press the chinrest down button (▼) and power switch on.

3 Keep the chinrest down button (▼) pressed until the massage "Please wait...Do not turn off the power." appears in the screen.

The device starts a setup for becoming ready to be packed. Wait without turning off the device power.

Note

- If pressing of the infrared filter lever or compensation lens select lever was not sufficient in Step 1, the setup is interrupted and a confirmation message appears.
 Pressing of infrared filter lever is not sufficient: "Please check the infrared filter."
 Pressing of compensation lens select lever is not sufficient: "Please check the compensation lens."
 Pressing the specified lever completely into the device clears the message and restarts the setup.

4 When the message "This device is now ready to be packed. Please turn off power." appears, turn off the power switch.

Note

- To restore the device from the condition ready to be packed, turn on the power switch as in the usual device startup.

○ Setting device ready to be packed automatically when turning off the device power

This method is convenient when the device is frequently packed for mass health screening or such reasons.

1 Confirm that the infrared filter lever and compensation lens select lever are completely pressed into the device.

2 Attach the cap on the objective lens.

3 Clean all parts (such as the chinrest and forehead rest) that came into contact with the patients.

4 Press the shutdown button  at the top left of the anterior eye observation screen.

The shutdown confirmation message appears in the middle of the screen.

5 Press YES in the shutdown confirmation message.

The device starts a setup for becoming ready to be packed. Wait without turning off the device power.

Note

- If pressing of the infrared filter lever or compensation lens select lever was not sufficient in Step 1, the setup is interrupted and a confirmation message appears

 Pressing of infrared filter lever is not sufficient: “Please check the infrared filter.”

 Pressing of compensation lens select lever is not sufficient: “Please check the compensation lens.”

 Pressing the specified lever completely into the device clears the message and restarts the setup.

6 When the message “Please turn off power” appears, turn off (◯) power to the device.

Note

- To restore the device from the condition ready to be packed, turn on the power switch as in the usual device startup.

2.5 Photography Mode Other Than Normal Photography Mode

This section explains the image capture procedure in modes other than Normal photography mode: Stereo photography mode, Panorama photography mode, Anterior eye photography mode, Small pupil photography mode, and Low-light photography mode.

2.5.1 Stereo photography mode

This mode is used to capture two fundus images: one at about 1 mm away to the temporal side from the fundus center, and the other at about 1 mm away to the nasal side from the fundus center. (The electronic working dot automatically moves to the shifted position.)

The two captured images are saved as a set and can be viewed stereoscopically using the special stereo viewer (optional accessory to NAVIS-EX).

Refer to the NAVIS-EX Operator's Manual for the method of the stereoscopic viewing of the image.

Setting for Stereo photography mode

Control menu: Photography settings—Photography Modes, STEREO—ON (default)

For details of setting, see "○ Photography modes" (Page 111).

The operating procedure below is explained in Stereo photography mode using the auto shot without the blink detector that is the default setting.

The image capture procedure is basically the same as "2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])" (Page 58) except that two horizontally shifted images are captured.

In Stereo photography mode, the first capture image is a temporal image and the second is a nasal image.

1 Prepare the patient for image capture.

The left eye is used for the explanation.

2 Press the Stereo photography button  to switch to Stereo photography mode.

3 Perform alignment using the joystick so that the anterior eye is displayed in the screen.

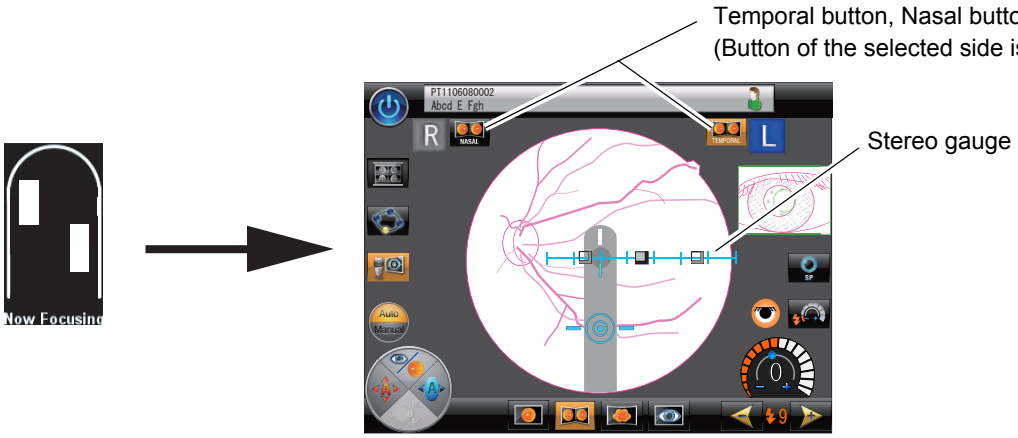
4 Adjust the joystick until the (eight) cornea-reflected spots appear.

When the eight cornea-reflected spots are detected, the image capture procedure is automatically advanced in the order as described below.

1) The auto tracking in the up, down, left, right forward, and backward directions is activated.
2) The electronic working dot (light blue) is displayed at a position shifted from the center to the right (about 1 mm toward the temporal side of the left eye) for the target mark to adjust to that position to enable stereo photography.
3) The working distance indicator is reduced to a single line and alignment is complete.

When alignment is complete, the auto focus icon appears, then the fundus observation screen is automatically displayed. In the fundus observation screen, the optical working dot charts disappear and the stereo gauge (blue) is displayed.

In this condition, the image capturing unit is aligned to the target position (about 1 mm shifted from the center to the temporal side of the left eye), and focused to the fundus.



4) When the proper focus to the fundus is achieved with the auto focus, the message “Capturing the image.” appears, then image capture is automatically executed with flash.

5 Check the captured image in the same manner as Step 7 (Page 62) in “2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])”.

6 To save the captured image, press the OK/Auto transfer button . To not save the captured image and perform image capture again, press the retry button .

The same action can be executed by rotating the joystick counterclockwise  or clockwise , then pressing the release button.

1) When the OK/Auto transfer button  is pressed, the captured image is saved in the USB flash drive, and the review screen is displayed.

2) If the image is dark or too bright when performing image capture again, adjust the flash intensity using the flash intensity up/down buttons.

Note

- In Stereo photography mode, image capture is performed in the order of temporal and nasal. So, the nasal image capture cannot be performed until the temporal image is saved. The temporal image capture can be skipped by pressing the nasal button at the upper part of the fundus observation screen.

7 When the anterior eye observation screen is displayed, perform the nasal image capture in the same manner as the temporal image capture.

In the nasal image capture for the left eye, the electronic working dot (green) is displayed at the position shifted about 1 mm from the center toward the nasal side, and the stereo gauge (green) appears on the left side of the screen contrary to the temporal image capture.

8 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then capture images in the same procedure as the above.

9 To perform image capture for the next patient, press the next patient button  to display the anterior eye observation screen, then perform the procedure from Step 1.

10 When image capture is complete, proceed to “2.4 Image Capture Shutdown Procedure” (Page 67).

2.5.2 Panorama photography mode

This mode is used to capture panoramic fundus images using the desired two to nine internal fixation lamps illuminated in the order specified in the “Pan. fixation lamps” screen.

Setting for Panorama photography mode

Control menu: Photography settings—Photography Modes, PANORAMA—ON (default)

Pan. fixation lamps for specifying two to nine fixation lamps

(Default: Seven lamps at the same positions as “ADV.” fixation lamp mode.)

For details of setting, see “O Photography modes” (Page 111) and “O Pan. fixation lamps” (Page 116).

The operating procedure below is explained in Panorama photography mode with seven lamps at the same position as “ADV.” fixation lamp mode using the auto shot without the blink detector that is the default setting.

1 Prepare the patient for image capture. Inform the patient in advance that seven images are captured for an eye and the internal fixation lamp appears at different positions each time.

The left eye is used for the explanation.

2 Press the panorama photography button  to enter Panorama photography mode.

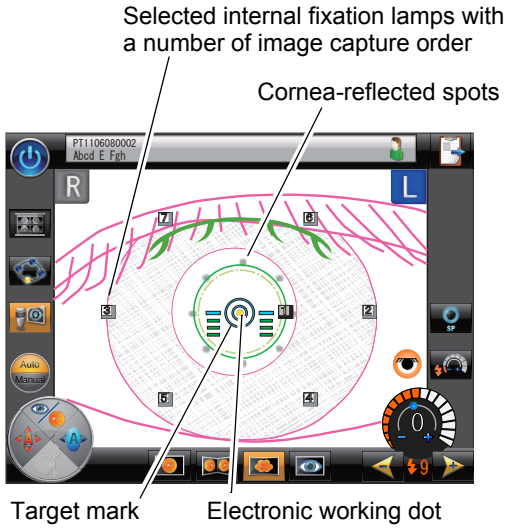
The internal fixation lamp marks assigned with a number indication the order of appearance from 1 to 7. The mark for the illuminating internal fixation lamp is gray, and the others are transparent.

3 Perform alignment using the joystick so that the anterior eye is displayed in the screen.

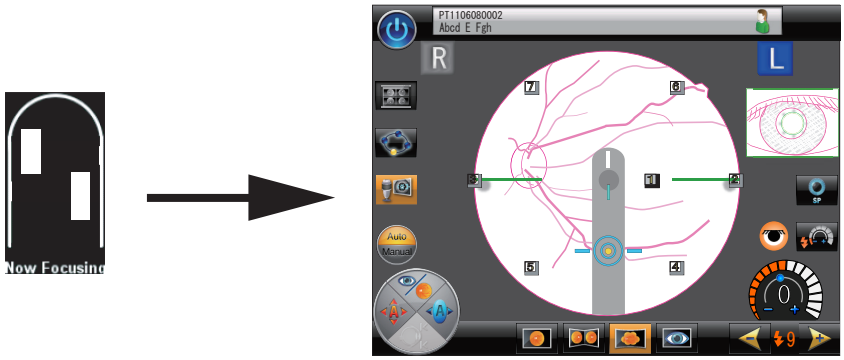
4 Make the (eight) cornea-reflected spots appear.

When the eight cornea-reflected spots are detected, the image capture procedure is automatically advanced in the order as described below.

1) The auto tracking in the up, down, left, right, forward, and backward directions is activated.
2) The anterior eye is displayed in the center of the screen (the electronic working dot is aligned to the center of the target mark).
3) The working distance indicator is reduced to a single line and the alignment is completed.



4) When the alignment is complete, the auto focus icon appears, then the fundus observation screen is automatically displayed.



5) When the proper focus to the fundus is achieved with the auto focus, the message “Capturing the image.” appears, then image capture is automatically executed with flash.

5 Check the captured image in the same manner as Step 7 (Page 62) in 2.3 Image Capture (Normal Photography Mode [Auto shot, No blink]).

6 To save the captured image, press the OK/Auto transfer button . To not save the captured image and perform image capture again, press the retry button .

The same action can be executed by rotating the joystick counterclockwise  or clockwise , then pressing the release button.

1) When the OK/Auto transfer button  is pressed, the captured image is saved in the USB flash drive, and the review screen is displayed.

2) If the image is dark or too bright when preforming image capture again, adjust the flash intensity using the flash intensity up/down buttons.

Note

- In Panorama photography mode, image capture with the next internal fixation lamp cannot be performed until the captured image is saved.

7 When the anterior eye observation screen is displayed, perform image capture with the next internal fixation lamp in the same manner.

After an internal fixation lamp is used, a check mark is displayed instead of the number.

Example:  to 

Note

- In Panorama photography mode, when repeating image capture with previously used internal fixation lamps, the check mark remains displayed and the number is not displayed, but the previously used internal fixation lamps illuminate again in the specified order.

8 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then capture images in the same procedure as the above.

9 To perform image capture for the next patient, press the next patient button  to display the anterior eye observation screen, then perform the procedure from Step 1.

10 When image capture is complete, proceed to “2.4 Image Capture Shutdown Procedure” (Page 67).

2.5.3 Anterior eye photography mode

This mode is used to capture anterior eye images, not fundus images.

Setting for Anterior eye photography mode

Control menu: Photography settings—Photography Modes, ANTERIOR—ON (default)

For details of setting, see “○ Photography modes” (Page 111).

Note

- When Anterior eye photography mode is selected, the ISO sensitivity of the camera is automatically fixed at 100.

The operating procedure is explained below.

1 Prepare the patient for image capture.

2 Select Anterior eye photography mode by pressing the anterior eye photography button .

The auto shot toggle button and the Auto/Manual toggle button are not displayed.

The auto tracking button, anterior eye/fundus auto advance button, auto focus button, and auto anti-misshooting button are disabled.

(The icons , ,  and  are displayed in black and white.)

The message “Switch to the + compensation lens” appears.

3 Pull the compensation lens select lever fully.

The plus compensation lens is inserted, and the compensation lens display at the bottom right of the screen changes from 0 to +.

The message “Switch to the + compensation lens” disappears.

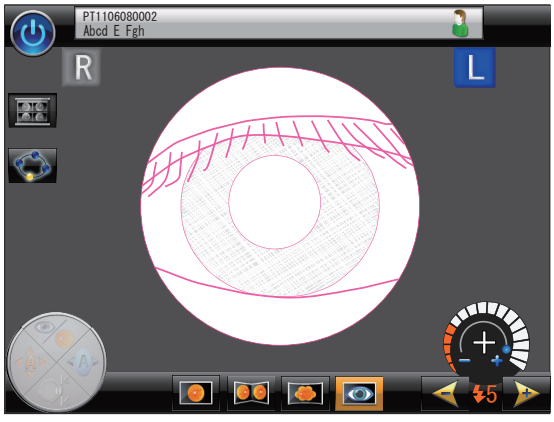
The default value of the flash intensity is 5.

Note

- Be sure to stop the compensation lens select lever at the position where a click is felt.
 If not, the right or left side of the image becomes dark and proper images cannot be captured.

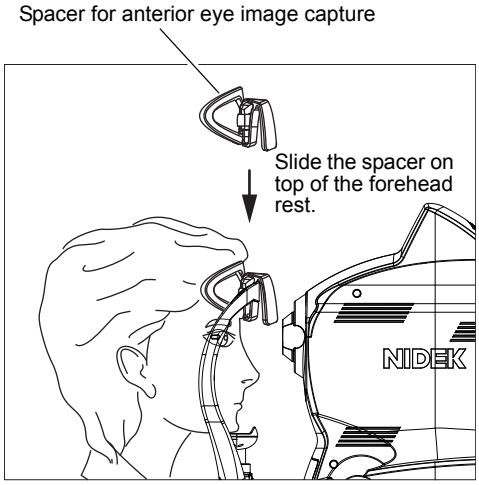
4 Move the image capturing unit fully back using the joystick.

5 Gradually move the image capturing unit forward using the joystick so that the anterior eye is displayed on the screen. Stop moving the image capturing unit when the anterior eye is focused.



6 Adjust the anterior eye to the center of the screen.

* If the anterior eye cannot be focused, attach the accessory spacer for anterior eye image capture as shown below, have the patient rest their head on the spacer, and perform the alignment again.
* Be sure to clean the spacer for anterior eye image capture before and after use.

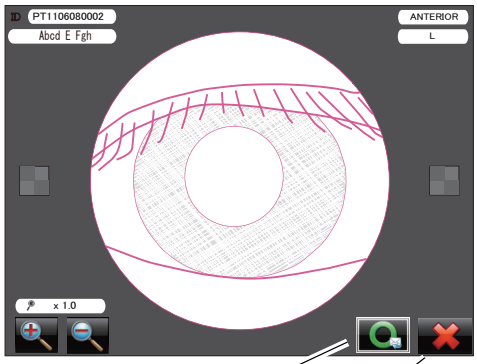


7 Execute image capture by pressing the Release button.

After the icons below appeared in the image processing screen, the preview screen displays the captured anterior eye image.



Image processing screen



OK/Auto transfer button

Retry button

Preview screen

8 Perform Step 7 (Page 62) to 8 of “2.3.1 Image Capture with auto shot”.

9 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then capture images in the same procedure as the above.

10 To perform image capture for the next patient, press the next patient button  to display the anterior eye observation screen, then perform the procedure from Step 1.

11 When image capture is complete, proceed to “2.4 Image Capture Shutdown Procedure” (Page 67).

2.5.4 Small pupil photography mode

If the patient's pupil is smaller than the required size (4.0 mm in diameter) but satisfies the minimum pupil size (3.3 mm in diameter), perform image capture in this mode. (Available in Normal, Stereo, and Panorama photography modes)

Setting for Small pupil photography mode

Control menu: Photography settings—Photography Modes, Small Pupil—ON (default)

When this mode is used (ON), the small pupil photography button 

is displayed in the screen. (When it is not used (OFF), the button is not displayed.)

Additional setting for Small pupil photography mode

Control menu: Photography settings—Photography options, Auto switch to SP photography mode—OFF (default)

When this function is enabled (ON), the device automatically detects whether the patient's pupil size satisfies the required pupil size and enters or exits Small pupil photography mode. Even when the setting is OFF, Small pupil photography mode can be enabled also by pressing the small pupil photography button. (When the "Auto switch to SP photography mode" function is ON and the small pupil photography button is pressed, the device exits Small pupil photography mode in about three seconds if the patient's pupil size satisfies the required pupil size.)

Control menu: Photography settings—Photography options, Light level in SP photography mode—0 (zero) (default)

In general the fundus image becomes dark in Small pupil photography mode. To capture images bright enough in Small pupil photography mode, the device increases the flash intensity three levels higher in Small pupil photography mode than in Normal photography mode. To capture darker images, the flash intensity can be reduced from 0 down to a minimum of –3.

For details of setting, see "○ Photography modes (page 111)" and "○ Photography options (page 113)".

Note

- In images captured in Small pupil photography mode, flare may be captured outside the image capture range mark.
- If the patient's pupil is smaller than the minimum pupil size (3.3 mm in diameter), proper images cannot be captured. In such a case, darken the room to make the pupil larger. If that does not enlarge the pupil enough, consider using mydriatics under the direction of a doctor.

The procedure is the same as "2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])" (Page 58) except for Steps 3, 4, and 7.

1 Perform Steps 1 to 4 of the "2.3.1 Image Capture with auto shot" (Page 58) and perform alignment using the joystick so that the anterior eye is displayed in the screen.

2 Perform either of the two steps below in accordance with the setting.

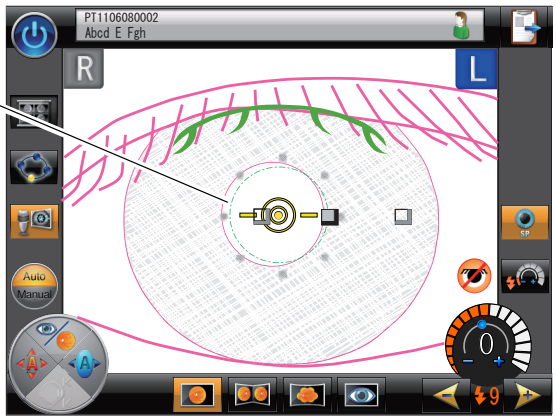
1) When the "Auto switch to SP photography mode" setting is OFF, press the small pupil photography button 

if the patient's pupil does not satisfy the required pupil diameter in the anterior eye observation screen (with the pupil edge in contact with the required pupil diameter mark and the required pupil diameter detection mark displayed as).

 The small pupil photography button 

changes from black to orange, and the device enters Small pupil photography mode.

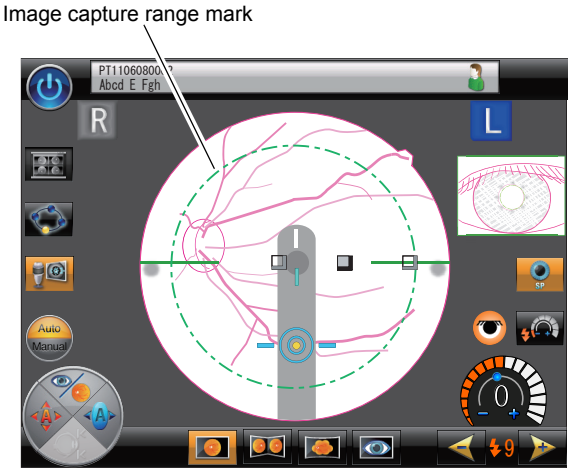
2) When the "Auto switch to SP photography mode" setting is ON, if the patient's pupil does not satisfy the required pupil diameter, the device automatically enters Small pupil photography mode.



Small pupil photography mode in the anterior eye observation screen

3 Perform alignment in the forward and backward directions using the joystick so that only a single line of the working distance indicator is displayed.

1) The anterior eye observation screen is switched to the fundus observation screen.
2) In the fundus observation screen, the Image capture range mark appears. If the patient's pupil is larger than the minimum pupil diameter (3.3 mm), the mark changes to .



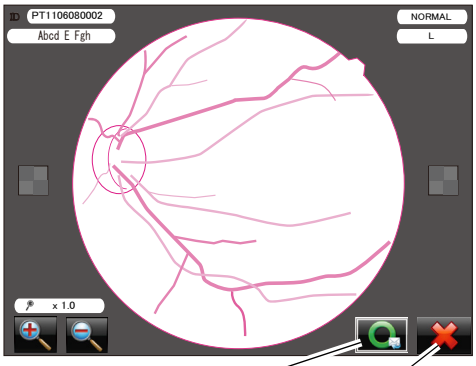
Small pupil photography mode in the fundus observation screen

3) When the proper focus to the fundus is achieved with the auto focus, the message "Capturing the image." appears, then image capture is automatically executed with flash.

4) After the icons below appeared in the image processing screen, the preview screen displays the captured fundus image.



Image processing screen



Preview screen

4 Perform Step 7 (Page 62) to 8 of “2.3.1 Image Capture with auto shot”.

5 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then capture images in the same procedure as the above.

2.5.5 Low-light photography mode

In Low-light photography mode, the automatic ISO speed adjustment allows capturing of images of the usual brightness with lower flash intensity than usual. It is useful for patients whose iris easily contracts. (Available in Normal, Stereo, and Panorama photography modes)

The level of flash intensity lowered in this mode differs depending on the ISO speed of the internal CCD camera as follows:

ISO100: Reduced 8 levels (about 1/4 of the specified flash intensity)
ISO200: Reduced 4 levels (about half the specified flash intensity)
ISO400: Not available

Setting for Low-light photography mode

Control menu: Photography settings—Photography Modes, Low-Light—ON (default)

When this mode is used (ON), the low-light photography toggle button  is displayed in the screen. (When it is not used [OFF], the button is not displayed.)

For details of setting, see “O Photography modes” (Page 111).

Note

- In Low-light photography mode, camera settings cannot be selected.
- The low-light photography toggle button is disabled when the ISO speed is 400, or the flash intensity specified using the flash intensity up/down buttons is lower than the level of reduction executed by the low-light photography toggle button.

 (orange background): ON

 (black background): OFF

 (Entire button is black and white): Disabled

When Low-light photography mode is turned ON, perform image capture in the procedure for Normal, Stereo, or Panorama photography mode.

2.6 Optional functions

This section explains the optional functions that facilitate image capture.

2.6.1 Anterior eye monitor

When this function is enabled, the anterior eye monitor appears in the fundus observation screen to display the live image as in the anterior eye observation screen.

This anterior eye monitor shows the cornea-reflected spots, required pupil diameter mark, and minimum pupil diameter mark. So, any shift in alignment can be observed even in the fundus observation screen, saving the trouble of returning to the anterior eye observation screen to perform alignment again.

Setting for anterior eye monitor

Control menu: Main unit settings—Main unit, Ant eye monitor—ON (default)

For details of setting, see “○ Main unit settings” (Page 105).

2.6.2 Auto shot

The auto shot is used to execute image capture with flash when proper alignment and focus are achieved on the fundus. (Available in Normal, Stereo, and Panorama photography modes)

Pressing the auto shot button toggles use of the auto shot (ON - color / OFF - black and white).

Setting for auto shot

Control menu: Photography settings—Photography options, Blink detector with Auto Shot—ON (default)

When this function is used (ON), image capture becomes possible when the patient blinks. This function is also useful when images are captured with multiple fixation lamps positions while observing the patient's eye.

For details of setting, see “○ Photography options” (Page 113).

Auto shot button



OFF—Image capture is automatically executed when the optimum alignment and focus are achieved in the fundus observation screen.



ON (Eyelid in icon)—When the patient’s blink is detected, image capture is automatically executed.

The image capture procedure without blink detector is explained in “2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])” (Page 58). This section explains the image capture procedure with blink detector.

1 Perform Steps 1 to 5 of “2.3 Image Capture (Normal Photography Mode [Auto shot, No blink])” (Page 58), so that the fundus observation screen is displayed.

When proper focus is achieved with the auto focus, the message “Please instruct the patient to close the eyes.” appears.

2 If the fundus observation screen is too dark or too bright, adjust the observation illumination intensity knob.

3 Change the internal fixation lamp position with the internal fixation lamp mark so that the desired part of the eye is displayed.

4 Instruct the patient to close their eyes.

When the device detects that the patient's eye is closed, the message "Please instruct the patient to open the eyes." appears.

5 Instruct the patient to open their eyes.

When the device detects that the patient's eye is open, image capture is automatically executed with flash.

6 Perform Step 7 (Page 62) to 8 of "2.3.1 Image Capture with auto shot".

7 To capture images of the other eye, pull the joystick toward the operator, then move the image capturing unit horizontally toward the other eye to display the anterior eye observation screen, then capture images in the same procedure as the above.

8 To perform image capture for the next patient, press the next patient button  to display the anterior eye observation screen, then perform the procedure from Step 1.

9 When image capture is complete, proceed to "2.4 Image Capture Shutdown Procedure" (Page 67).

2.6.3 Alignment area change

When low-sensitivity auto tracking is used (: blue) or the auto tracking is not used (: black and white), the alignment area can be changed at the time of image capture of peripheral areas depending on the internal fixation lamp position.

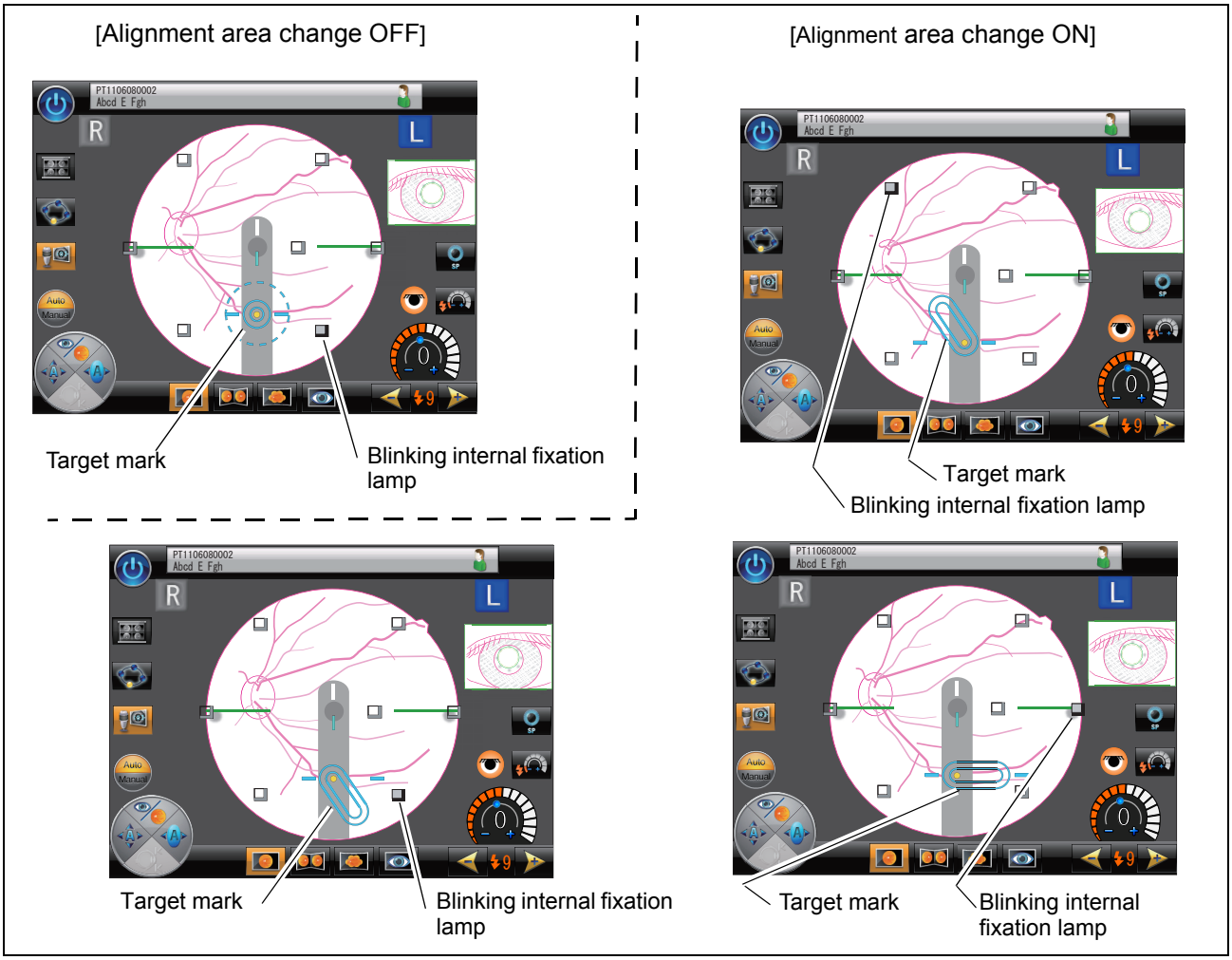
Setting of "Alignment area change"

Control menu: Photography settings—Photography options, Alignment area change—ON (default)

When "Alignment area change" is set to ON, the target mark changes to various elliptic shapes depending on the internal fixation lamp position at peripheral areas.

When the patient gazes at the blinking interior fixation lamp at peripheral areas, the image may be obscured by iris. The elliptic target mark helps avoid such a case by allowing the electronic working dot to be manually moved within it toward the pupil center.

For details of setting, see "○ Photography options" (Page 113).



Note

- In Stereo photography mode, the alignment area cannot be changed.

2.6.4 High-sens tracking: fixation shift

When high-sensitivity auto tracking is used ( : orange), the alignment position is automatically changed depending on the internal fixation lamp position and the diameter of the patient's pupil at the time of image capture of peripheral areas.

Setting for "High-sens tracking: fixation shift"

Control menu: Photography settings—Photography options, High-sens tracking: fixation shift—ON (default)

For details of setting, see "○ Photography options" (Page 113).

When the patient gazes at the blinking internal fixation lamp at peripheral areas, the image may be obscured by iris. The peripheral photography assistance function helps avoid such a case by automatically shifting the alignment position toward the pupil center.

Note

- In Stereo photography mode, alignment position does not change for high-sensitivity tracking.

2.6.5 Split indicator

The split indicator that indicates the amount of focus error is displayed by default in the fundus observation screen. It can be set not to be displayed.

Setting for split indicator

Control menu: Photography settings—Photography options, Split indicator—ON (default)

For details of setting, see "○ Photography options" (Page 113).

When OFF is selected, the split indicator is not displayed.

Note

- Even when the split indicator is OFF, the split indicator is displayed when the auto shot is ON.

2.6.6 Image Capture interval

The device is designed not to use intense light. However, although there are individual differences, the patient]'s pupil contracts to some extent after non-mydriatic image capture. When image capture is continued on the same eye or the other eye, an interval may be needed for proper image capture.

The image capture interval display shows the approximate lapsed time after execution of image capture by changing the color of the minimum pupil diameter mark from red to green gradually starting in the 12 o'clock direction.

This interval display functions as an hourglass.

The interval time can be set in the range from 1 to 10 minutes in 1 minute increments. The interval display can be set not to be displayed. The default setting is 1 minute.

For details of setting, see "○ Photography options" (Page 113).

Example: Execution of image capture

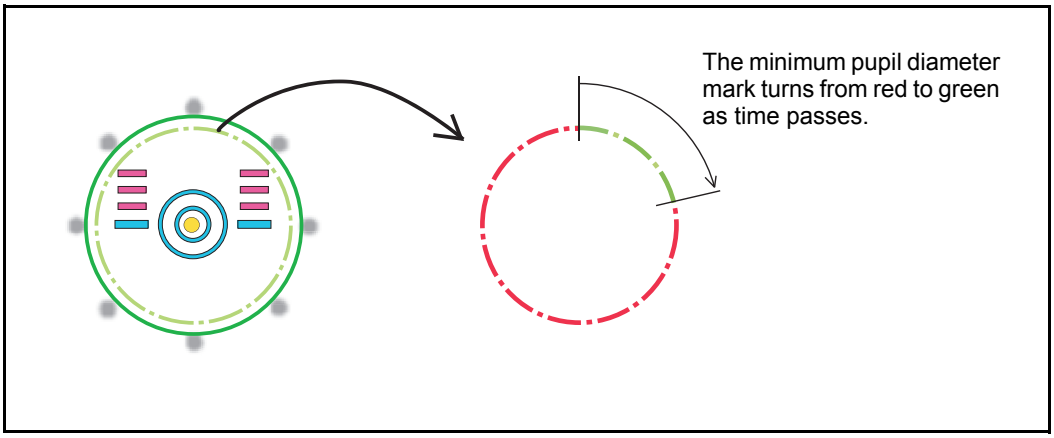
↓

Alignment in the anterior eye observation screen for the next image capture

(The image capture interval display appears during this time.)

The speed of the interval display changes depending on the time setting.

Example: 1 minute—The red minimum pupil mark turns green in a minute.



2.7 Registering, editing, and searching patient information

This section explains the method of registering, editing, and searching patient information.
These operations can be executed with two methods: Direct input by the operator in the screen or use of a CSV file. Available functions differ between them.

2.7.1 Registering patient in the screen

Three methods are available to register patients in the anterior eye observation screen.

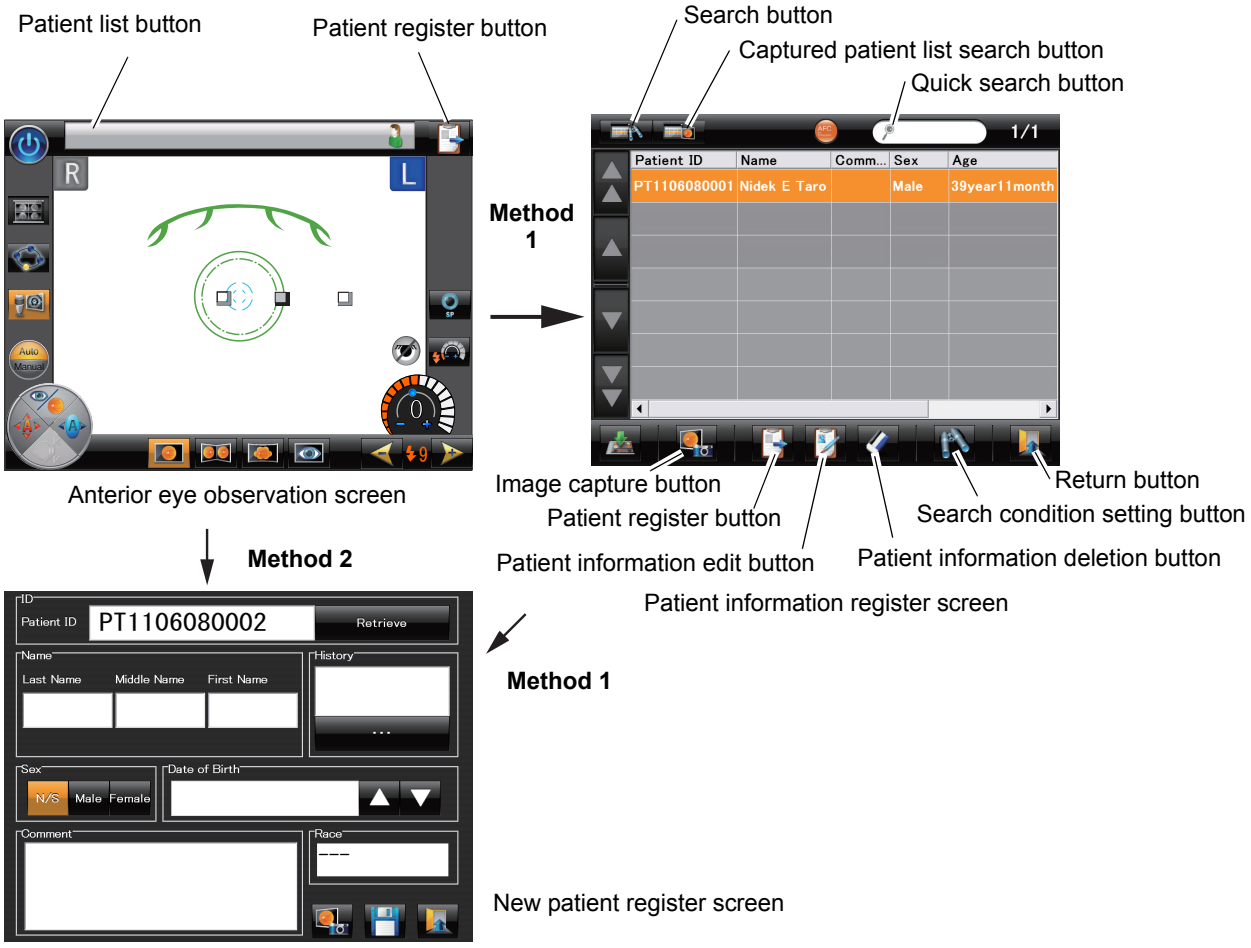
1. Register patients by opening the new patient register screen from the patient information register screen.
2. Register patients by directly opening the new patient register screen.
3. Register patient ID using the Patient ID quick registration function.
 (For the Patient ID quick registration function, see “O Patient ID quick registration function” (Page 90).)

The procedures for the basic methods 1 and 2 above are as shown below.

Method 1: Press the patient list button .

When the patient information register screen is displayed, open the new patient register screen by pressing the patient register button .

Method 2: Open the new patient register screen by pressing the patient register button  at the top right of the anterior eye observation screen.



○ Registering patients

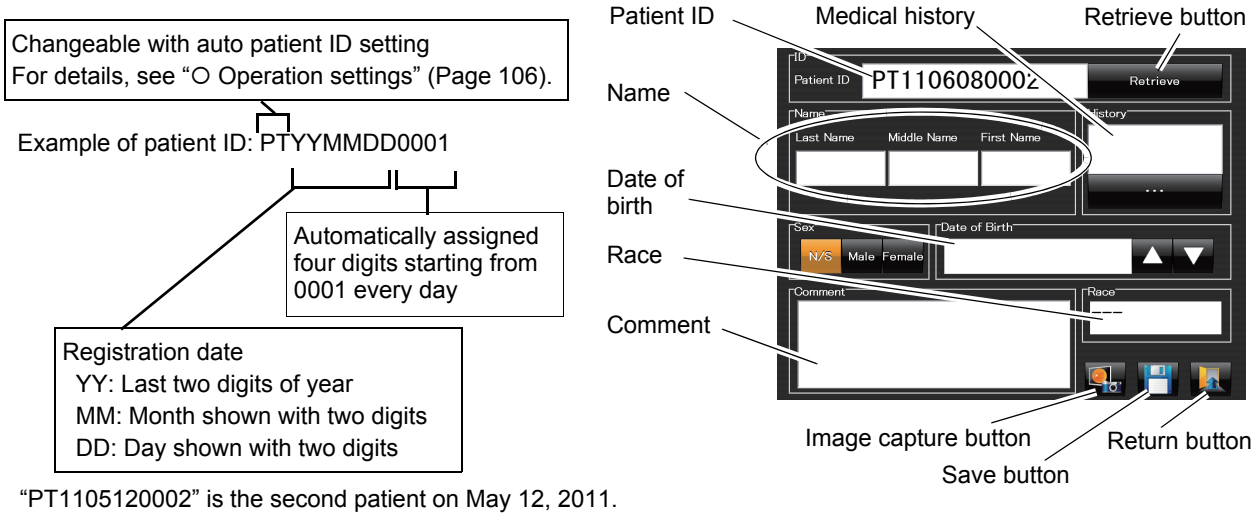
This section explains the method of registering a new patient.

1 Press the patient register button .

The new patient register screen appears.

The patient ID is automatically assigned to the patient ID box.

If the device is LAN-connected (to NIDEK Image filing software NAVIS-EX), and patient information registration with a CSV file are enabled, the patient ID is not automatically assigned.



"PT1105120002" is the second patient on May 12, 2011.

Note

- When the device is connected to NAVIS-EX, the desired patient information can be read from the connected storage device by pressing the Retrieve button after inputting the patient ID in the Patient ID box.

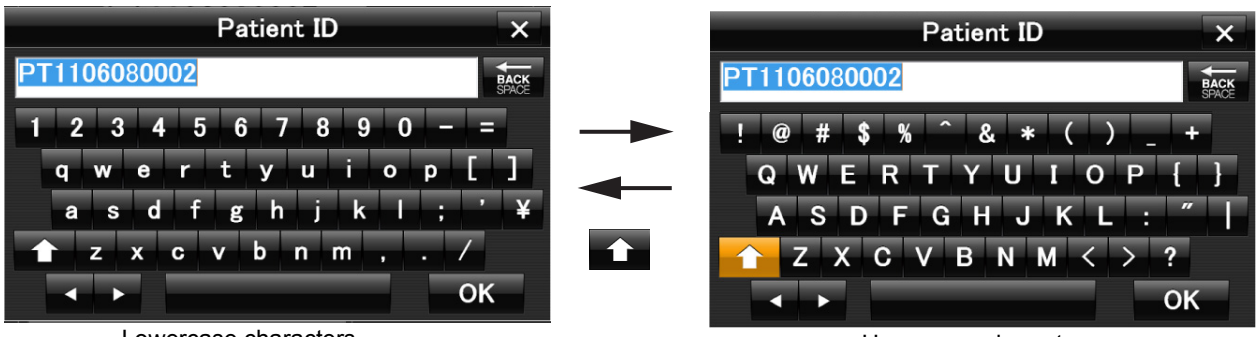
Changing the patient ID:

The patient ID can be changed only when it is newly registered.

Once the patient ID is registered, it cannot be changed.

1) Press the patient ID box in the new patient register screen.

A keyboard is displayed.



Lowercase characters — Keyboard for patient ID — Uppercase characters

2) Edit the patient ID using the keyboard.

For the patient ID, uppercase and lowercase alphabetical characters and numerical characters can be used. Other characters such as symbols cannot be input.

To use uppercase characters, press the key. Then uppercase characters are displayed on the keys of the keyboard.

3) Press the OK key.

The new patient register screen is displayed with the changed patient ID.

Note

- To cancel inputting of characters using the keyboard, click the button.
- This keyboard does not have the Delete key. To delete characters, press the BACK SPACE key.

2 Input the patient name.

1) Press the Last Name box.

The procedure of inputting the patient name is explained with the last name.

2) Input the last name of the patient.

3) To use uppercase characters, press the key. Then uppercase characters are displayed on the keys of the keyboard. Pressing the key again returns to lower-case characters.



Keyboard for patient name

4) Press the OK key.

The new patient register screen is displayed with the input last name.

5) Input the other name boxes in the same manner as the last name box.

3 Press Male or Female for sex.

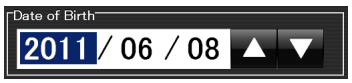
The pressed button becomes orange. The default setting is “N/S”.

4 Input the date of birth of the patient.

1) Press the or button on the side of the date of birth box.

The date of the current day (or of a year ago) is displayed in the date of birth box.

Year/Month/Day

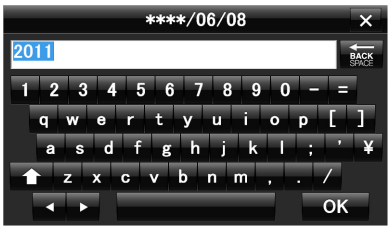


2) Press the year indication.

The keyboard for inputting the year appears.

3) Input the year of birth, then press the OK key.

The new patient register screen is displayed with the input year.



Keyboard for inputting year

4) Press the month indication.

The keyboard for inputting the month appears.

5) Input the month of birth, then press the OK key.

The new patient register screen is displayed with the input month.

6) Press the day indication.

The keyboard for inputting the day appears.

7) Input the day of birth, then press the OK key.

The new patient register screen is displayed with the input day.



Keyboard for inputting month



Keyboard for inputting day

5 Input medical history if the patient has suffered any diseases in the past.

There are two method to input the name of diseases.

- Inputting using the keyboard
- Selecting from the list of diseases input in the past

Inputting medical history using keyboard:



1) Press the medical history box.

The keyboard for inputting the name of diseases appears.

2) Input the name of diseases as in Step 2.

3) Press the OK key.

The new patient register screen is displayed with the input diseases.

Selecting medical history from the list:

1) Press the medical history list button ... at the bottom of the history field.

The medical history list appears.

2) Search the name of the disease in the list.

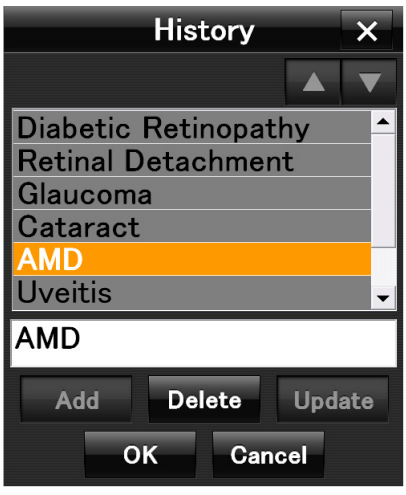
If there are seven names or more in the list, the scroll bar appears on the right of the list to show hidden names.

3) Press the name of the disease.

The characters of the selected name become white and the background becomes orange, indicating that the name is being selected.

- If the name of the disease cannot be found in the list, press the blank box above the Add button.

 Input the name of the disease and press the OK key.



Medical history list

4) Press the OK button.

The new patient register screen is displayed with the input diseases.

Editing medical history list

Adding names of diseases

1) Press the blank box in the medical history list.

 The keyboard for inputting the name of diseases appears.

2) If any of the diseases in the list is selected (orange background), press the selected disease to cancel the selection.

 When the selection is cancelled, the characters become black and the background becomes gray.

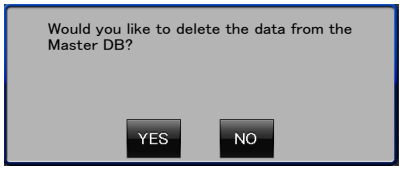
3) Input the name of the disease using the keyboard as in Step 2.

4) Press the Add button.

Deleting names of diseases

1) Press and select the name of the disease to be deleted, then press the Delete button.

 The delete confirmation screen appears.



Delete confirmation screen

2) Press the YES button.

 The medical history list is displayed, and the deleted disease is not in the list. For confirmation, the deleted disease is in the blank box.

3) Press the OK button.

 Deletion of the disease from the medical history list is determined.

Changing the order of diseases

It is convenient to move frequently selected diseases to the top of the medical history list so that they can be selected without using the scroll bar.

1) Select a frequently selected disease.

2) Pressing the ▲ or ▼ button at the top of the medical history list moves the selected disease a row up or down. The position is determined without pressing the OK button.

6 If necessary, input the race.

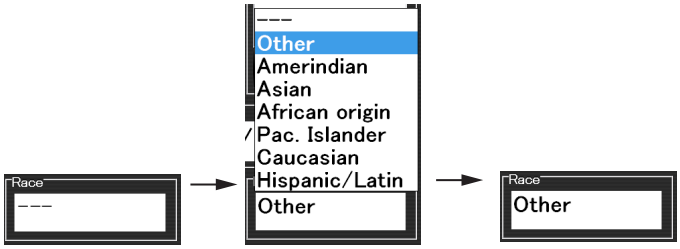
1) Press the race box.

 A pull-down menu for selecting the race appears.

2) Press and select the applicable race.

 The pull-down menu is closed, and the selected race appears in the race box.

 The default setting is “---”.



7 If necessary, input any comments in the comment box.

1) Press the comment box.

 The keyboard for inputting comments appears.

2) Input comments.

3) Press the OK key.

 The new patient register screen is displayed with the input comments.

8 Press the save button in the new patient register screen.

The patient information register screen is displayed and the new patient is registered.

If the return button is pressed instead of the save button, the input information is canceled.

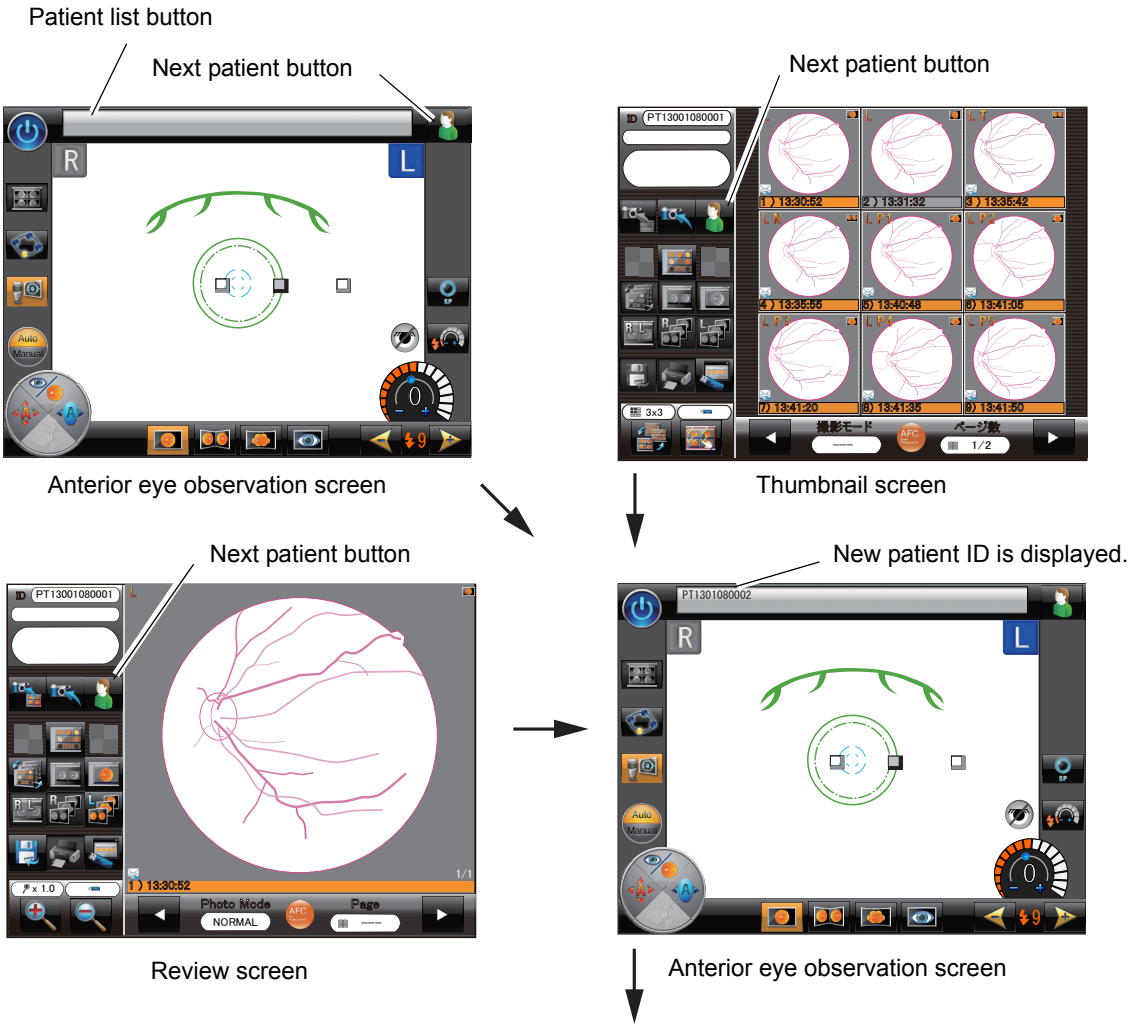
○ Patient ID quick registration function

When the Patient ID quick registration function is set to ON, pressing the Next patient button in the anterior eye observation screen, thumbnail screen, or review screen automatically acquires a new patient ID and allows image capture for the next patient.

The Patient ID quick registration function, which acquires patient ID without opening the new patient register screen, is convenient for when image capture is performed consecutively for a lot of patients such as in mass health screening.

For the Patient ID quick registration function, see “○ Operation settings” (Page 106).

For the setting of auto patient ID, see “○ Registering patients” (Page 86).



○ Editing patient information

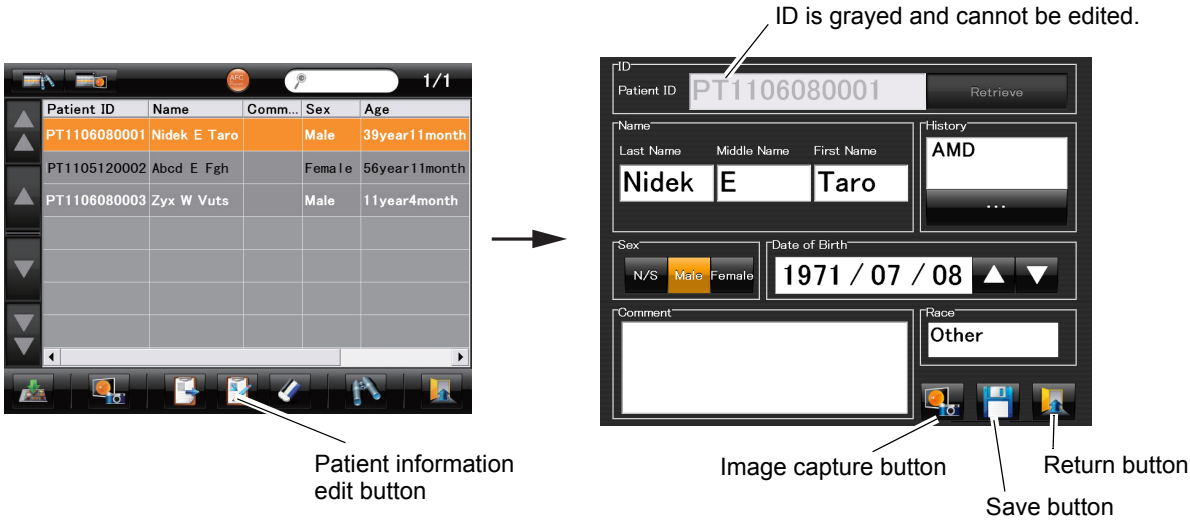
This section explains the method of editing registered patient information.

Note

- Patient information cannot be edited in the cases shown below. In such cases, edit patient information after changing the setting or with the connected PC.
 - When the device is LAN-connected (to NIDEK Image filing software NAVIS-EX)
 - When patient information registration and reading with a CSV file are enabled.

1 Select the desired patient, then press the patient information edit button  in the patient information register screen.

The patient information edit screen is displayed.



Patient information register screen

Patient information edit screen

2 Edit the desired item in the same manner as Steps 2 to 7 in "○ Registering patients" (Page 86).

3 Press the Save button .

The patient information register screen is displayed and the patient information is changed as edited.

If the return button  is pressed instead of the save button, the editing of the patient information is cancelled.

Note

- Selecting any patient on the patient information register screen changes the background color of the selected patient name from gray to orange.
- Patients who have had image capture performed on the current day are shown in darker gray than the patient for whom image capture has not been performed in the patient information register screen, and the characters of their patient ID and patient name are displayed in black instead of white.

○ Deleting patient information

To delete patient information registered in the patient information register screen, it can be selected whether to delete only the selected patient information or to delete all the patient information.

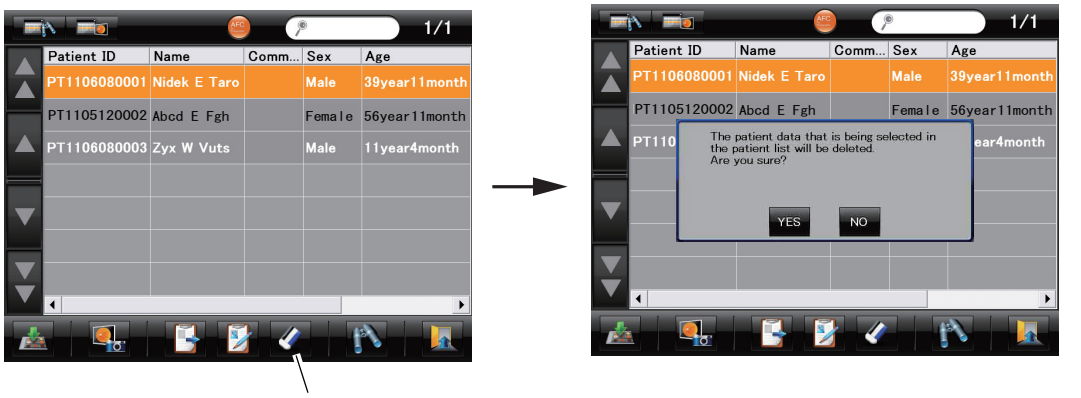
Note

- Deleted patient information cannot be restored.
- Patient data cannot be deleted when the device is connected to Image Filing Software NAVIS-EX.

<Deleting only the selected patient information>

1 In the patient information register screen, select the patient information to delete. Then click (press for about 0.5 second or less) the patient information deletion button .

The patient information deletion confirmation screen is displayed.



Patient information deletion button

Patient information register screen

Patient information deletion confirmation screen

2 To delete the selected patient information, press “Yes”.

The selected patient information is deleted.

<Deleting all patient information>

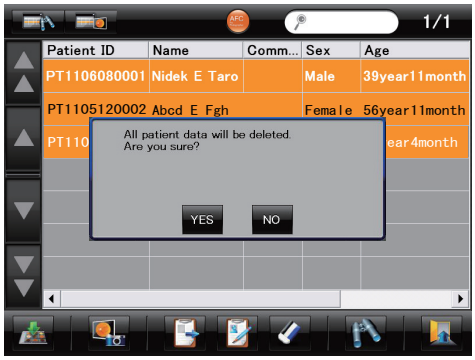
1 Press and hold (for about 3 seconds or more) the patient information deletion button  in the patient information register screen.

All patient data is selected, and the patient information deletion confirmation screen is displayed.



Patient information deletion button

Patient information register screen



Patient information deletion confirmation screen

2 To delete all patient information, press Yes.

All patient information displayed in the patient information register screen is deleted.

○ Retrieving patient information

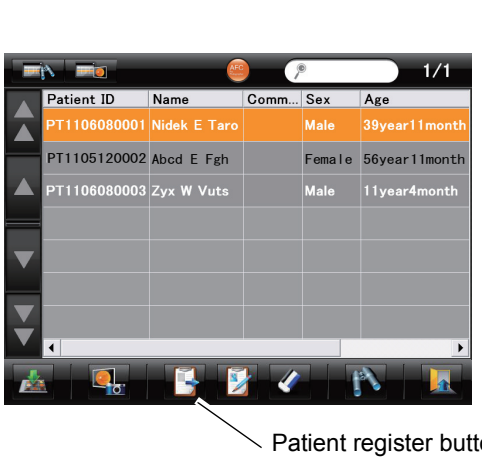
This section explains the method of retrieving patient information from the connected storage device.

<When the device is connected with NAVIS-EX>

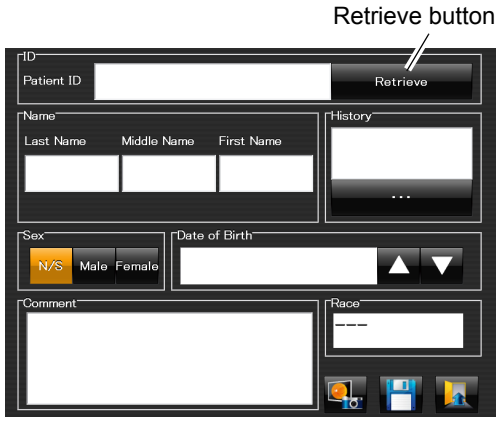
Patient information registered in the NAVIS-EX database can be viewed.

1 Press the patient register button  in the patient information register screen.

The new patient register screen is displayed.



Patient information register screen



New patient register screen

2 Press the Patient ID button.

The keyboard is displayed.

3 Input the desired patient ID using the keyboard, then press the OK key.

The new patient register screen is displayed, and the input patient ID appears.

4 Press the Retrieve button.

When the patient data with the input patient ID exists

The patient information is input.

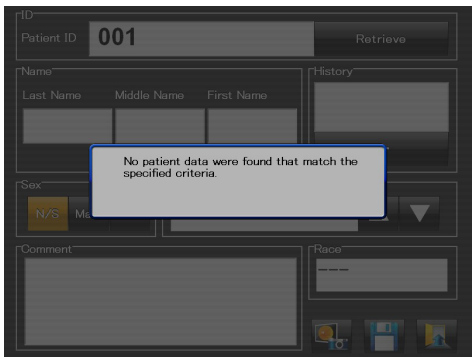
The patient information cannot be edited.

When the patient data with the input patient ID does not exist

The message shown to the right appears.

Pressing the message screen displays the new patient register screen.

* To capture images with a registered input patient ID, continue inputting other patient information items, then press the release button.



<When the device is LAN-connected to FILE or a USB flash drive is connected>

Patient information registered in the database within the device can be viewed.

1 Perform Steps 1 to 3 of **<When the device is connected with NAVIS-EX>** in the previous page.

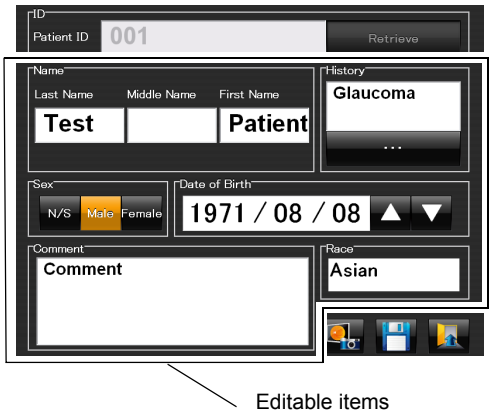
2 Press the Retrieve button.

When the patient data with the input patient ID exists

The patient information is input.

The retrieved patient information can be edited.

However, when “CSV File” setting is ON, patient information cannot be edited.



When the patient data with the input patient ID does not exist

The same message as Step 4 of **<When the device is connected with NAVIS-EX>** appears.

Pressing the message screen displays the new patient register screen.

* To capture images with a registered input patient ID, continue inputting other patient information items, then press the release button.

○ Searching patient information

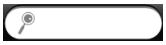
This section explains the method of searching registered patient information.
There are three methods to search, and all of them are executed in the patient information register screen.
Using these search methods, the patient information can be searched as shown below.

Example 1

Step1: Searching information such as medical history and sex using the search condition setting button 

Step2: Narrowing the search to the current day using the captured patient list search button 

Example 2

Step1: Rough search using the quick search button 

Step2: Narrowing the search to the current day using the captured patient list search button 

< Search using search condition setting button  >

1 Press the search condition setting button .

The search condition setting screen is displayed.





Search condition setting button

Cancel button

Return button

Patient information register screen

Search condition setting screen

There are nine search items. Patient data sets that satisfy all the specified conditions are displayed.

Patient ID / Medical history / Name / Comments

(Right truncation is applied to Patient ID, Medical history, and Name. Wildcard search is applied to Comments. Medical history and Comments are case-sensitive.)

Race

Sex (N/S, Male, Female) / Age (N/S, Range [YYY – YYY])

Reg Date (N/S, Range [Range of registration date YYYYMMDD – YYYYMMDD])

Exam Date (N/S,

Range [Range of examination date YYYYMMDD – YYYYMMDD]

[Range of examination time hh:mm – hh:mm]

No Exams [Patient for whom no image has been captured or saved])

Example of range specification for Exam Date—

Date: 2011/05/05–2011/07/14

Time: 09:00–13:00

In this example, patient information is searched in the hours from 9:00 AM to 1:00 PM in the period from May 5, 2011 to 14 July, 2011.

When the same times are input, for example, “09:00–09:00”, time is excluded from the search conditions.

Note

- When the device is used in connection with NAVIS-EX through a LAN, the result of the search may differ depending on the operation conditions of other instruments used in connection with NAVIS-EX.

2 Input the desired search items in the same manner as Steps 2 to 7 in “○Registering patients” (Page 86).

Pressing the cancel button  resets the search conditions input in the search condition setting screen.

Pressing the return button  displays the patient information register screen without executing the search (without determining the search conditions) or resetting the search conditions.

3 Press .

The patient information register screen is displayed with the search results.

At this time, the search button at the top left of the screen  is displayed in orange to indicate that the search results are being displayed.

Pressing the search button  in this condition changes its color to black and white and displays the patient information register screen in the same condition as before the search.

To cancel the search, press the cancel button  then  in the search condition setting screen.

< Search using captured patient list search button  >

Pressing this button displays the patient information register screen that shows only the patients with any image captured or saved on the current day.

At this time, the captured patient list search button is displayed in orange, indicating that the search results are displayed.

Pressing the button again changes its color to black and white, and the patient information register screen is displayed in the same condition as before the search. Display of the search results can be toggled with this button.

< Search using quick search button [] >

This button enables a quick search of patient information that contains the alphabetical or numeric characters input here in any of the items below.

Only a maximum of ten characters are displayed in the button. Characters more than ten are not displayed in the button but included in the search.

In the quick search, wildcard search is applied to all the four search conditions.

Medical history and Comments are case-sensitive.

- **Patient ID**
- **Name**
- **Medical history**
- **Comments**

1 Press [].

The keyboard for quick search appears.

2 Input the alphabetical or numerical characters included in the desired information.

3 Press the OK button.

The input characters are displayed in [], and the search results are displayed in the patient information register screen.



Keyboard for quick search

To cancel the search, delete all characters in the keyboard, then press the OK button.

2.7.2 Registering patient information using CSV file

This section explains the procedure of patient information registration using the CSV file.
CSV files can be acquired using network-connected PCs or USB flash drives.

Note

- For the device setting to allow use of CSV files, ask NIDEK or your authorized distributor.
- If special characters are included in the patient information in the CSV file, the patient name or other items may become unreadable.
- It is recommended to keep the number of patients contained in a single CSV file 100 or less.

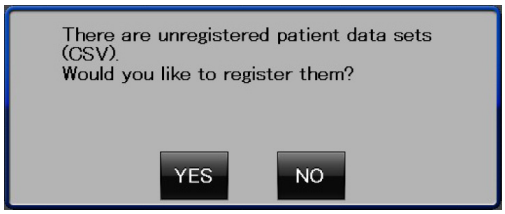
 If an excessive number of patients are in a single file, registration takes a considerable amount of time, and may interfere with the device operation.

1 Save the CSV file in the specified folder.

The CSV file is automatically loaded to the device. The loaded CSV file is deleted from the specified folder.

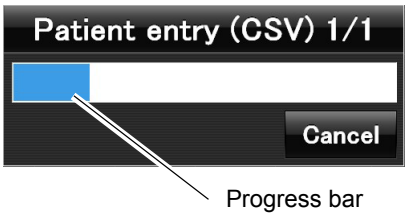
2 Select or change the patient.

Because there is the loaded CSV file, the message as shown to the right appears.



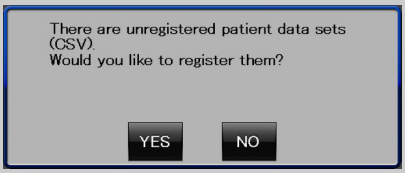
3 Press the YES button to register the patient information in the CSV file to the patient list.

During the registration process, the progress bar as shown to the right appears.



Note

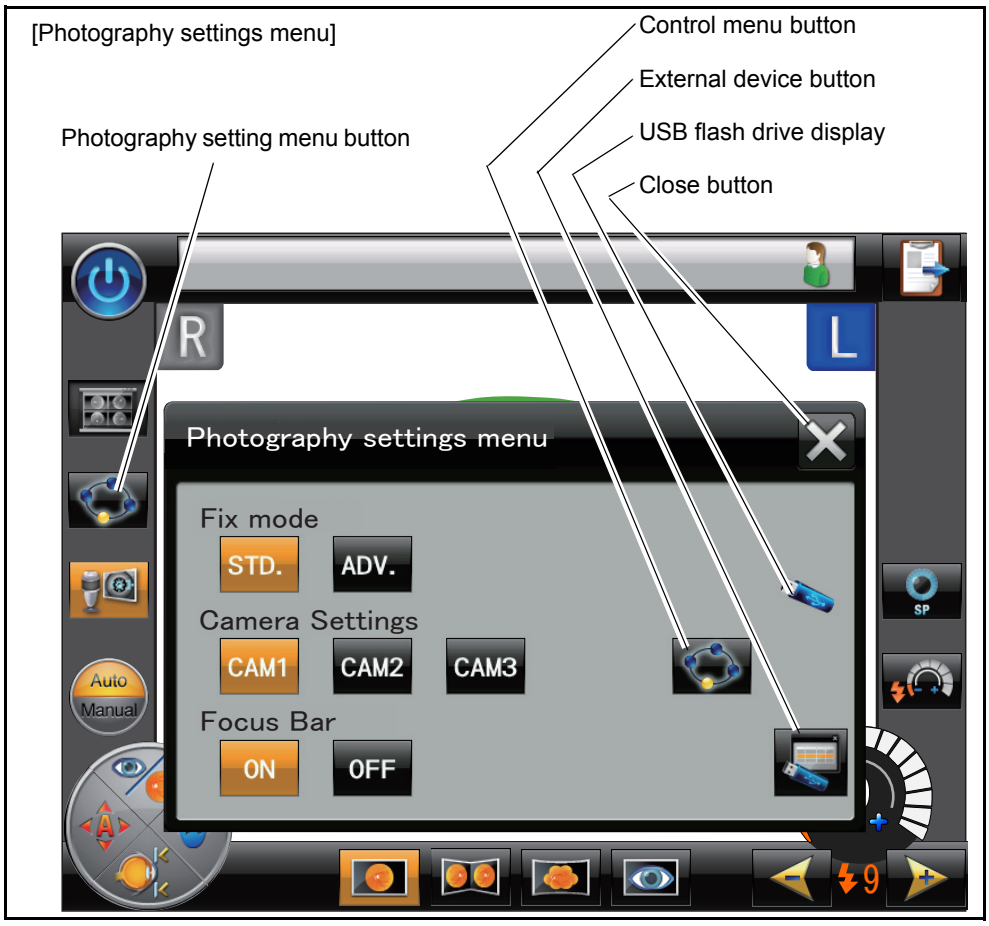
- If the NO button is pressed, the patient information in the loaded CSV file is not registered to the patient list, and the CSV file remains in the device. At the time of the next patient selection or change, the message appears again. The message appears each time until the content of the loaded CSV file is registered.



2.8 Photography settings menu

The Photography settings menu screen allows changing of the fixation lamp, camera, and focus bar settings. It also provides buttons such as the control menu button or the USB flash drive button that open the screens for detailed settings for the device or external devices.

Pressing the photography setting menu button  displays the Photography settings menu screen.



2.8.1 Fixation lamp mode

Select the desired fixation lamp button from the Fix mode buttons in the Photography settings menu screen. (The selected button is displayed in orange.)
There are the Standard and Advanced patterns for the internal fixation lamp positions. In addition, in Panorama photography mode, the number and positions of the internal fixation lamps are specified.
If the patient cannot fix their gaze on the internal fixation lamp, the external fixation lamp (optional accessory) can be used.

○ Internal fixation lamp

There are three patterns for the internal fixation lamp illumination.

STD. : Standard

Allows illumination of the internal fixation lamps to be positioned at three locations in order to center in the captured image the following portions of the eye: the macula, the optical disc, and the midpoint between the two. The three locations cannot be altered.

ADV. : Advanced

Allows illumination of the internal fixation lamps at seven positions each of which guides the following portions of the eye to the center of captured images: the midpoint between the macula and the optical disc, and six points in the peripheral areas. The seven positions cannot be moved.

Pano : Panorama

This button is displayed only in Panorama photography mode. In the default setting, the number and positions of the internal fixation lamps are the same as those for the Advanced pattern.
For details of the setting, see “○ Pan. fixation lamps” (Page 116).

Note

- At peripheral areas, the internal fixation lamp may not be visible from the patient.

<Operation of internal fixation lamp during image capture>

1 During the alignment, press the desired fixation lamp mark.

The pressed fixation lamp changes from  to , and the internal fixation lamp of the touched position illuminates.

In Panorama photography mode, the position of the illuminating fixation lamp automatically changes for each image.

○ External fixation lamp

EXT.

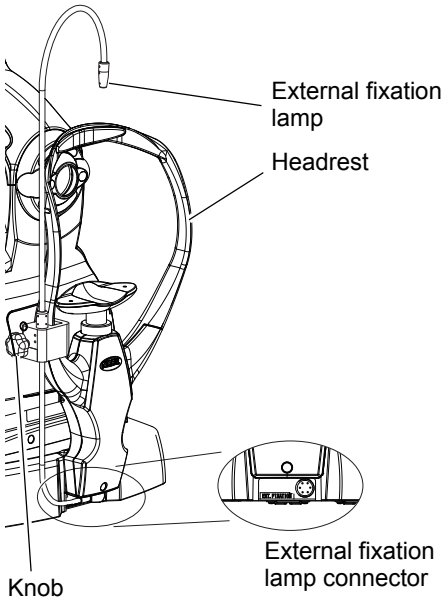
This button is displayed only when the external fixation lamp unit cable is connected to the external fixation lamp connector.
In Panorama photography mode, this button is not displayed and cannot be illuminated.

<Installing the external fixation lamp>

1 Attach the external fixation lamp on the left side (as viewed from the patient) of the headrest as shown to the right and fasten it by tightening the knob.

2 Connect the external fixation lamp cable to the external fixation lamp connector.

The internal fixation lamp can be used even when the external fixation lamp unit is connected.



<Operation of the external fixation lamp during image capture>

1 Instruct the patient to gaze at the external fixation lamp with the other eye.

2 While observing the fundus observation screen, move the external fixation lamp to guide the patient's eye to the desired direction, fix it, then capture an image.

2.8.2 Camera setting

A maximum of three image capture conditions can be preset and saved in the device as “CAM1”, “CAM2”, and “CAM3” for later use. These conditions can be differentiated by conditions such as image size or image quality and used depending on various situations.

CAM1 , CAM2 , or CAM3 (The selected camera setting is displayed in orange.)

The selected camera setting continues to be selected even when the device power is turned off.

For details and setting, see “O CAM1, CAM2, CAM3” (Page 117).

2.8.3 Focus bar

Display of the focus bar in the fundus observation screen can be toggled. The focus split used to adjust the focus on the fundus is projected on the focus bar.

ON : Displayed

Usually, display the focus bar. (Default)

OFF : Not displayed

When the focus bar is not displayed, the focus needs to be adjusted manually without the aid of the focus split.

2.9 Control Menu

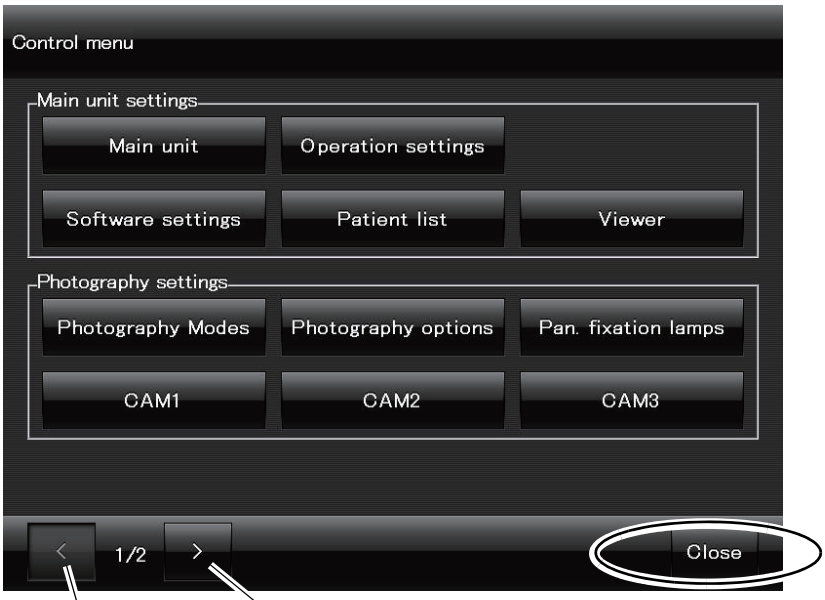
The Control menu screen allows detailed setting of the device.

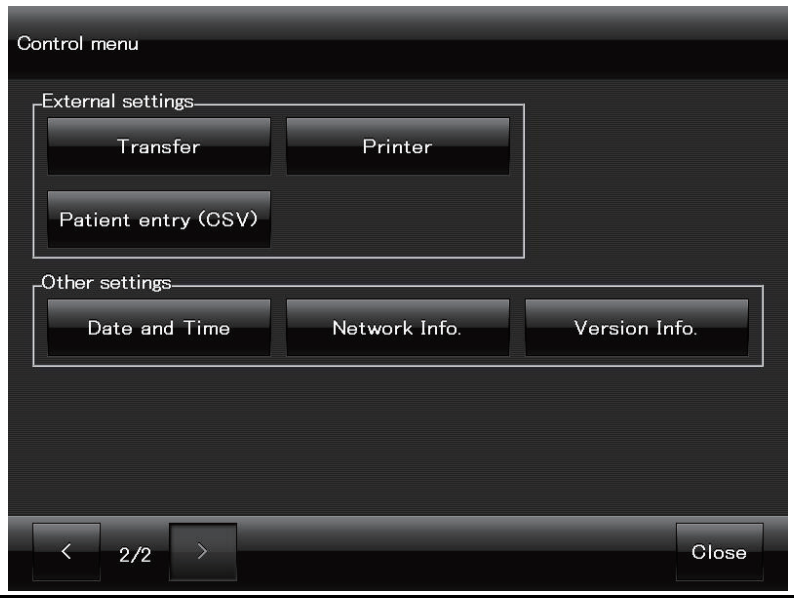
Pressing the control menu button  in the Photography settings menu screen displays the Control menu 1/2 screen.

There are two Control menu pages, and can be switched using the advance or return button.

When changing of the desired settings are complete, close the Control menu screen by pressing the Close button at the bottom right of the screen to return to the anterior eye observation screen.

[Control menu]





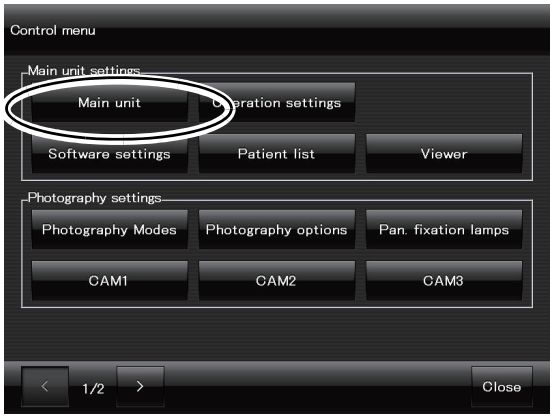
2.9.1 Main unit settings

○ Main unit settings

1 Press the Main unit button in “Main unit settings”.

The Main unit screen is displayed.

[Control menu 1/2]



2 Set the parameters for the device operation.



* Default settings are underlined.

Item	Options
Beep	Large/Small/OFF Volume of beep that sounds when buttons are pressed or errors occur
Sleep	15MIN/10MIN/5MIN Idle time before entering Sleep mode
LCD Back Light	HIGH/MID/LOW Brightness of the LCD touch-screen
Hand Lighting	HIGH/LOW/OFF Intensity of the hand light for the operation panel
R/L Disp	R/L / OD/OS Type of indication of right and left eyes
Ant. eye monitor	ON/OFF Display of the anterior eye monitor during fundus observation
Chinrest Init	ON/OFF Initialization of the chinrest height at the device start up or when the patient is changed.

Item	Options
Packing mode after shutdown	ON/OFF It can be selected whether or not to set the device ready to be packed (by setting the image capturing unit and chinrest to the positions specified for transport) when the device power is turned OFF. (For details of the operation, see “2.4.2 Finishing operation in order to transport the device: Packing mode” (Page 68).) If the device is transported or moved frequently, setting this function to ON is convenient because the device automatically becomes ready to be packed after use.

3 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed.

Note

- The << and >> buttons are provided on both sides of the Menu button in the screen for detailed settings. Pressing these buttons instead of the Menu button advances or returns to other screens for detailed settings. They are useful when there are many parameters to be changed.

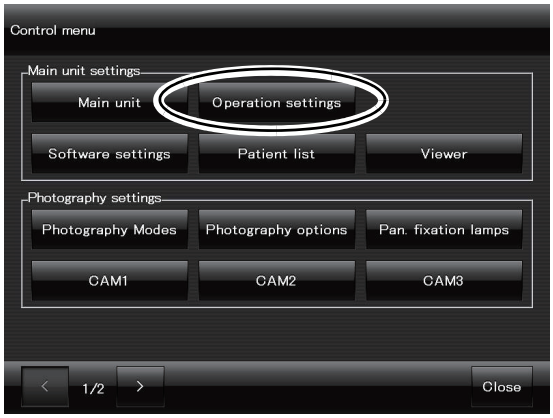
 Example: Main unit screen → Operation settings screen → Software settings screen → Patient list screen → Viewer screen → Photography Modes screen → Photography options screen → ...

○ Operation settings

1 Press the Operation settings button in “Main unit settings”.

The Operation settings screen is displayed.

[Control menu 1/2]



2 Set the parameters for the operation of the device.



* * Default settings are underlined.

Item	Options
Patient ID quick registration function	ON / <u>OFF</u> Selecting “ON” displays the Next patient button  at the top right of the anterior eye observation screen. Pressing the Next patient button in any of the anterior eye observation screen, thumbnail screen, and review screen assigns a new patient ID to the next patient without opening the new patient register screen, and allows image capture for that patient. When the device is restarted, the sequential patient IDs are assigned in the same manner. For the details of the assigned patient ID, see “Setting of auto patient ID” below.
Setting of auto patient ID	PT +YYMMDD+Identification number Setting of patient ID automatically assigned when any of the following operations is performed ・Pressing of patient register button  ・Starting the device with the Patient ID quick registration function set to ON ・Pressing of the Next patient button  in the anterior eye observation screen, thumbnail screen, or review screen with the Patient ID quick registration function set to ON PT: Pressing the box opens the keyboard to allow setting change. Character limit: A maximum of five alphanumeric characters YYMMDD: Date of patient registration (device use) that is unchangeable YY: Last two digits of year, MM: Two-digit expression of month, DD: Two-digit expression of day Number: Four-digit sequential numbers (0001-) that is unchangeable. The number is initialized to 0001 when the date is changed within the device.
Patient List at startup	ON / <u>OFF</u> Display of the patient information register screen immediately after the device startup or when the Next patient button  is pressed in the thumbnail screen or review screen When OFF is selected, the anterior eye observation screen is displayed. (Without patient ID display) If the Patient ID quick registration function is set to ON, the function of the Next patient button on the thumbnail and review screens becomes that of the Patient ID quick registration function.
Review monitor	<u>ON</u> / OFF Display of the review screen by pressing the OK/Auto transfer button  or OK button  in the preview screen after image capture

3 When the setting is complete, press the Menu button.

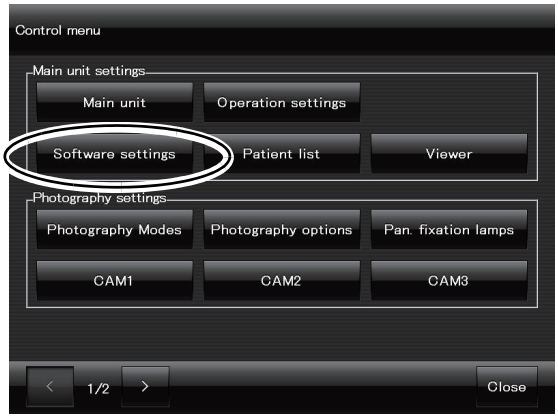
The Control menu 1/2 screen is displayed.

○ Software settings

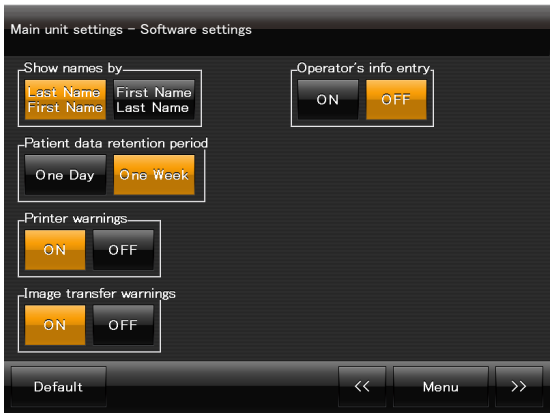
1 Press the Software settings button in “Main unit settings”.

The Software settings screen is displayed.

[Control menu 1/2]



2 Set the parameters for the software.



* Default settings are underlined.

Item	Options
Show names by	Last name, First name / First name, Last name
Patient data retention period	One day / One Week Period of time during which data registered or obtained with the device is saved in the device Example: When “One day” is selected, the device displays a message when it is started to urge the operator to decide whether to save or discard patient data of the day before.
Printer warnings	ON / OFF Display of a warning if the patient is switched while printing is being executed
Image transfer warnings	ON / OFF Display of a warning if the patient is switched when a captured image has not been transferred
Operator’s info entry	ON / OFF Registration and printing of operator’s ID is toggled.

3 When the setting is complete, press the Menu button.

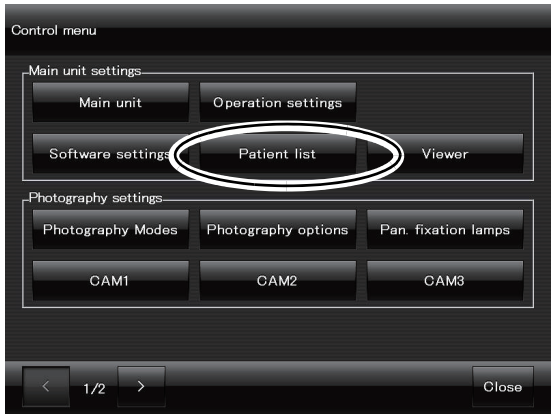
The Control menu 1/2 screen is displayed.

○ Patient list

1 Press the Patient list button in “Main unit settings”.

The Patient list screen is displayed.

[Control menu 1/2]

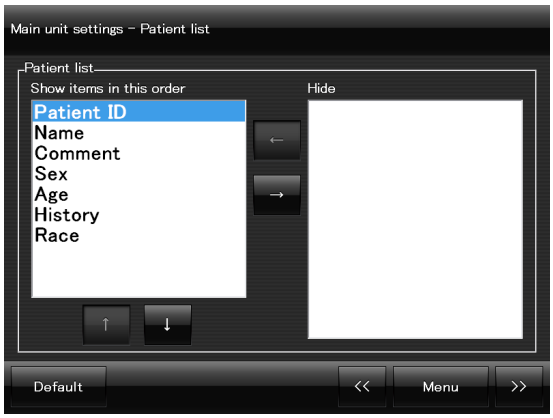


2 Select the items to be input in the patient list, and the order of their display.

<Setting items not displayed>

1) From the “Show items in this order” list, touch the item that is not to be displayed.
2) Press the → button.

 The selected item is moved to the Hide list.
3) To move additional items to the Hide list, repeat Steps 1) and 2).



Note

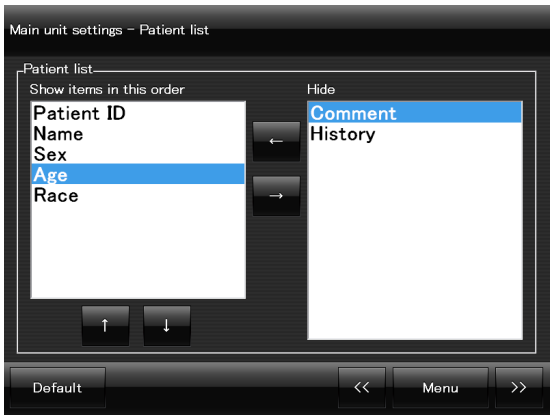
- “Patient ID” cannot be moved to the Hide list. An error message “Patient ID cannot be set to hide.” appears.

 “Patient ID” must be included in the patient information.

<Setting items to be displayed>

1) From the Hide list, touch the item to be displayed.
2) In the “Show items in this order” list, select the item under which the item selected in the Hide list is to be added.
3) Press the ← button.

 The item selected in the Hide list comes under the item selected in the “Show items in this order” list.



4) To move additional items to the “Show items in this order” list, repeat Steps 1) to 3).

<Changing the order of items>

1) In the “Show items in this order” list, select the item to change the order of display.

2) Press the ↑ button to move the item one position up, and pressing the ↓ button moves the item one position down in the list.

3 When the setting is complete, press the Menu button.

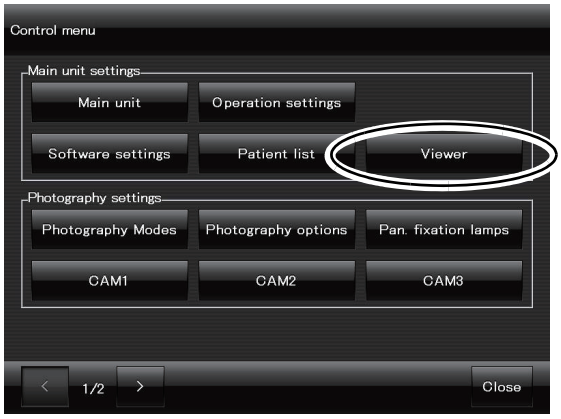
The Control menu 1/2 screen is displayed.

○ Viewer

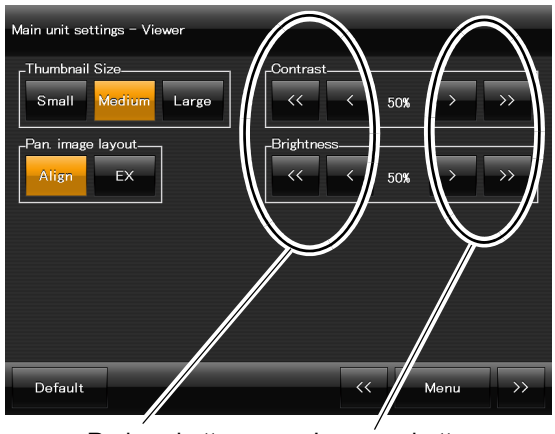
1 Press the Viewer button in “Main unit settings”.

The Viewer screen is displayed.

[Control menu 1/2]



2 Set the parameters for display of captured images.



Reduce button　　Increase button

* Default settings are underlined.

Item	Options
Thumbnail Size	Small / <u>Medium</u> / Large Size of thumbnails displayed in the thumbnail screen Small: 4×4 (16 images), Medium: 3×3 (9 images), Large: 2×2 (4 images) In the thumbnail screen, the size can be changed using the thumbnail size button  .
Pan. image layout	<u>Align</u> / Ex Layout of panorama images in the thumbnail screen Align: Same layout as the internal fixation lamp positions for panorama photography Ex: Same layout as non-panorama images

Item	Options	
Contrast	1 - 50 - 100%	< , > : 1% increments << , >> : 10% increments
Brightness	1 - 50 - 100%	

Note

- Depending on the setting of the internal fixation lamp, the entire image information cannot be viewed. In such a case, change the “Pan image layout” setting from Align to EX.
- The “Contrast” and “Brightness” settings are only for the LCD touch-screen. They do not have any effect on the contrast or brightness of captured images.

3 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed.

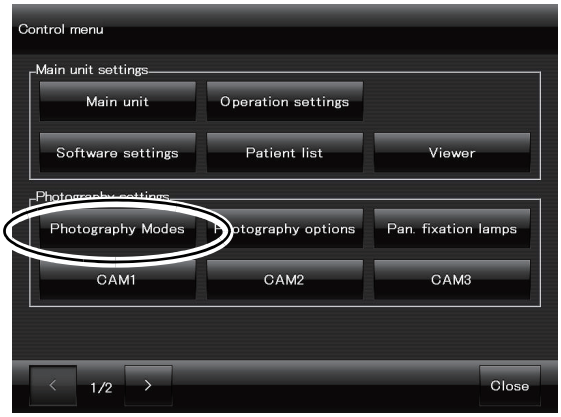
2.9.2 Photography settings

○ Photography modes

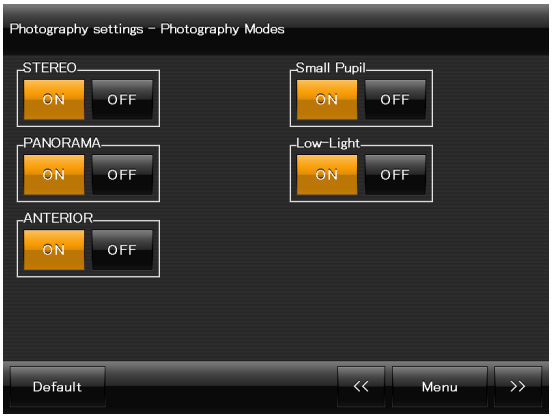
1 Press the Photography Modes button in “Photography settings”.

The Photography Modes screen is displayed.

[Control menu 1/2]



2 Set the parameters for photography modes.



* Default settings are underlined.

Item	Options
STEREO	ON / OFF Use of Stereo photography mode is toggled. When OFF is selected, the button for this mode is not displayed in the anterior eye observation screen or the fundus observation screen.
PANORAMA	ON / OFF Use of Panorama photography mode is toggled. When OFF is selected, the button for this mode is not displayed in the anterior eye observation screen or the fundus observation screen.
ANTERIOR	ON / OFF Use of Anterior eye photography mode is toggled. When OFF is selected, the button for this mode is not displayed in the anterior eye observation screen or the fundus observation screen.
Small Pupil	ON / OFF Use of Small pupil photography mode is toggled. When OFF is selected, the button for this mode is not displayed in the anterior eye observation screen or the fundus observation screen.
Low-Light	ON / OFF Use of Low-light photography mode is toggled. When OFF is selected, the button for this mode is not displayed in the anterior eye observation screen or the fundus observation screen.

Note

- If OFF is selected for Stereo photography, Panorama photography, and Anterior eye photography modes, the Normal photography button is not displayed either in the anterior eye observation screen and the fundus observation screen. However, images can be captured in Normal photography mode.

3 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed.

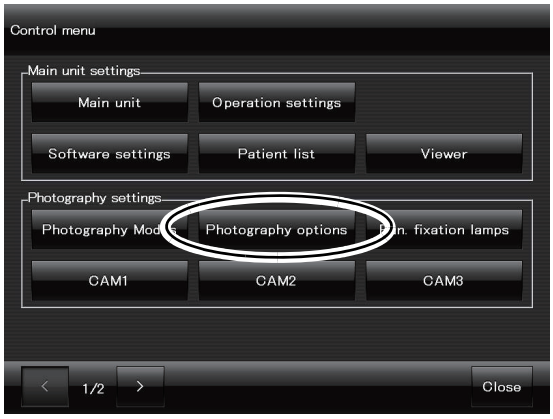
To restore the default setting, press the Default button at the bottom left of the screen before pressing the Menu button.

○ Photography options

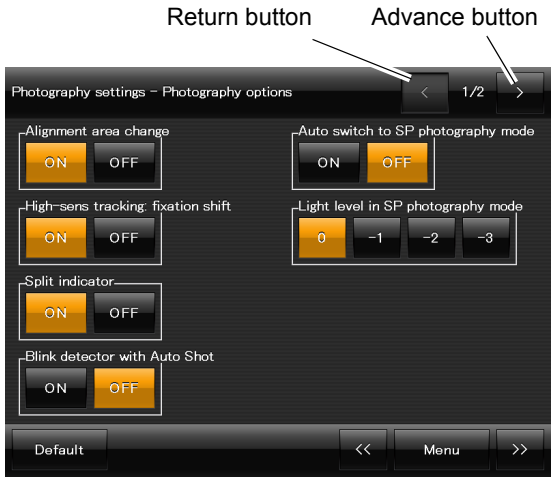
1 Press the Photography options button in “Photography settings”.

The Photography options screen is displayed.

[Control menu 1/2]



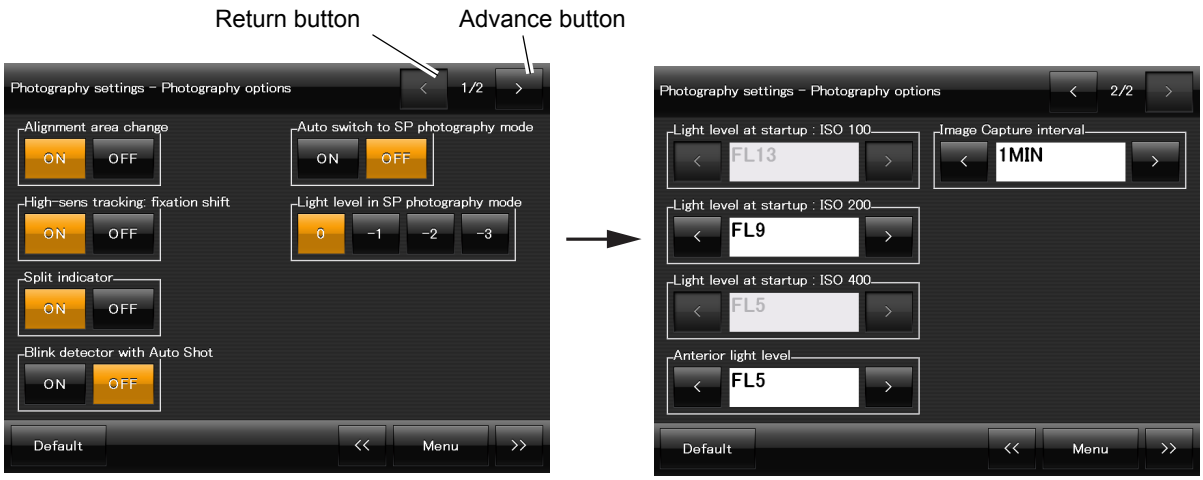
2 In the Photography options 1/2 screen, set the parameters for optional functions for image capture.



* Default settings are underlined.

Item	Options
Alignment area change	ON / OFF Changing the alignment area depending on internal fixation lamp positions when images of the peripheral area are captured with low-sensitivity tracking or with the auto tracking disabled.
High-sens tracking: fixation shift	ON / OFF Use of automatic shift of the alignment position toward the pupil center to prevent the iris from obscuring the image during image capture of peripheral areas with high-sensitivity tracking
Split indicator	ON / OFF Display of the split indicator that shows the degree of focus error in the fundus observation screen Even when the split indicator is OFF, the split indicator is displayed when the auto shot is ON.
Blink detector with Auto Shot	ON / OFF Execution of image capture with the auto shot after detecting the patient's blink
Auto switch to SP photography mode	ON / OFF Automatic switching to Small pupil photography mode
Light level in SP photography mode	0 / -1 / -2 / -3 Level of flash intensity compensation in Small pupil photography mode

3 Press the advance button to display the 2/2 screen, then set the parameters.



* Default settings are underlined.

Item	Options	
Light level at startup: ISO 100	FL1 to FL12, <u>FL13</u>, FL14 to FL17 Flash intensity for the camera settings, CAM1, CAM2, or CAM3 when the ISO speed is set to 100 The flash intensity can be reduced or increased three levels from the default FL13. When the ISO speed is not set to 100 for none of the camera settings, CAM1, CAM2, or CAM3, the parameter is grayed and cannot be changed.	
Light level at startup: ISO 200	FL1 to FL8, <u>FL9</u>, FL10 to FL17 Flash intensity for the camera settings, CAM1, CAM2, or CAM3 when the ISO speed is set to 200 The flash intensity can be reduced or increased three levels from the default FL9. When the ISO speed is not set to 200 for none of the camera settings, CAM1, CAM2, or CAM3, the parameter is grayed and cannot be changed.	
Light level at startup: ISO 400	FL1 to FL4, <u>FL5</u>, FL6 to FL17 Flash intensity for the camera settings, CAM1, CAM2, or CAM3 when the ISO speed is set to 400 The flash intensity can be reduced or increased three levels from the default FL5. When the ISO speed is not set to 400 for none of the camera settings, CAM1, CAM2, or CAM3, the parameter is grayed and cannot be changed.	< Previous option > Next option
Anterior light level	FL1 to FL4, <u>FL5</u>, FL6 to FL17 Flash intensity for Anterior eye photography mode The flash intensity can be reduced or increased three levels from the default FL5.	
Image Capture interval	OFF, <u>1MIN</u>, 2MIN, 3MIN, – 10MIN Time of interval display after image capture The interval can be set in 1 minute increments. (The interval time is not displayed when OFF is selected.) When 1MIN is selected, the minimum pupil diameter mark is displayed for a minute after image capture. For details of the display, see “2.6.6 Image Capture interval” (Page 84).	

4 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed.

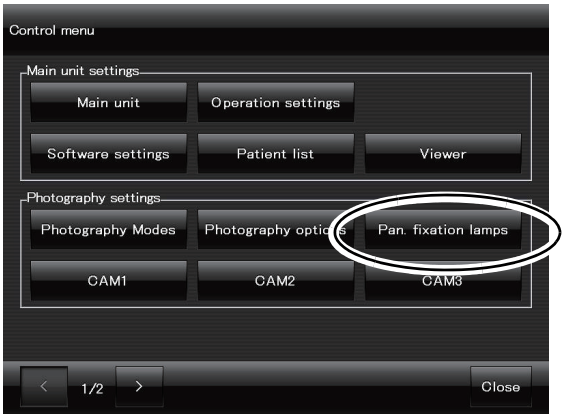
To restore the default setting, press the Default button at the bottom left of the screen before pressing the Menu button.

○ Pan. fixation lamps

1 Press the “Pan. fixation lamps” button in “Photography settings”.

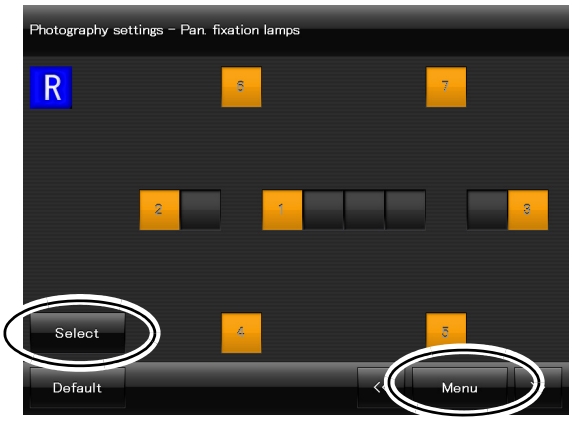
The “Pan. fixation lamps” screen is displayed.

[Control menu 1/2]



2 Press the Select button.

Setting of the internal fixation lamp positions becomes enabled.

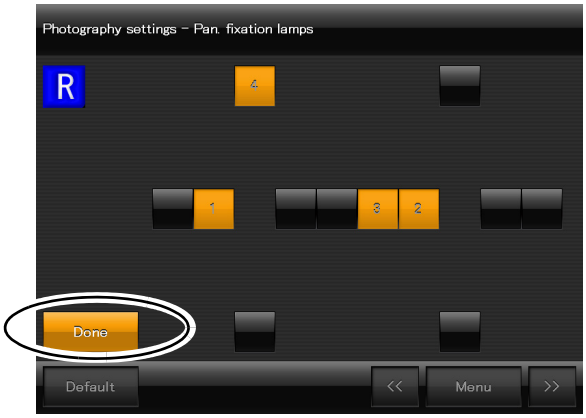


3 Select the desired internal fixation lamp positions by pressing the buttons.

Out of the 12 buttons, 2 to 9 positions can be selected.

A number is assigned to each button in the order of selection. The internal fixation lamp illuminates in the order of the assigned number in Panorama photography mode.

Although the setting in this screen is only for the right eye, the selected internal fixation lamp positions are mirror reversed for the left eye image capture.



Note

- Depending on the setting of the internal fixation lamp, the entire image information cannot be viewed. In such a case, change the “Pan image layout” setting from Align to EX in accordance with “○ Viewer” (Page 110).

4 When selection of the internal fixation lamp positions is finished, press the Done button.

The Done button changes to the Select button, and the Menu button becomes enabled.
To restore the default setting, press the Default button at the bottom left of the screen.

5 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed.

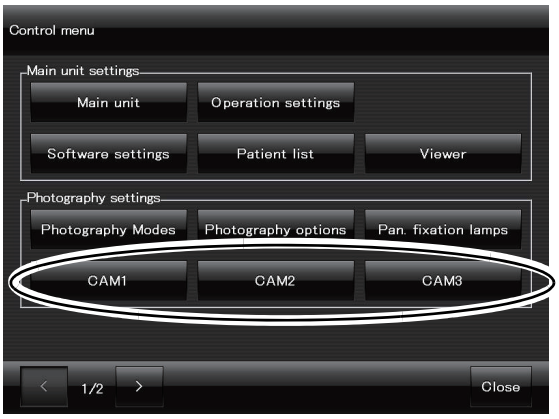
○ CAM1, CAM2, CAM3

1 Press any of “CAM1”, “CAM2”, and “CAM3” in “Peripheral settings”.

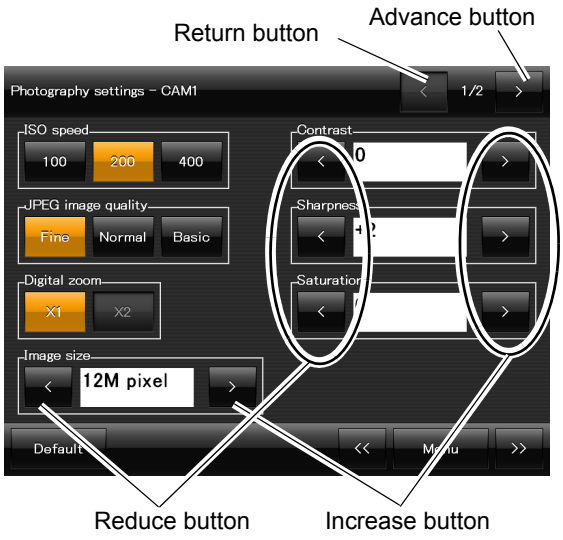
The screen for setting the parameters of the selected camera setting is displayed.

The procedure is explained with “CAM1”.

[Control menu 1/2]



2 Set the parameters in the CAM1 1/2 screen.



* Default settings are underlined.

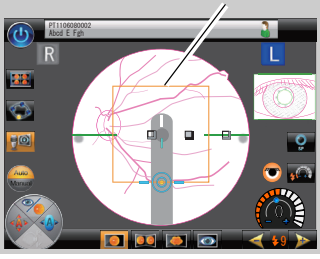
Item	Options
ISO speed	100 / <u>200</u> / 400 The camera speed can be changed. Compared with ISO 100, images of the same brightness can be captured with half the intensity using ISO 200 and 1/4 of the intensity using ISO 400. However, the increasing the ISO speed increases the noise in the image. In Anterior eye photography mode, the parameter is fixed to ISO 100.

<table>
<tr><th>Item</th><th colspan="2">Options</th></tr>
<tr><td>JPEG image quality</td><td colspan="2">Fine / Normal / Basic
The compression rate of created images can be changed. The file size varies depending on the settings for images.
Guideline of file sizes
<table>
<tr><td colspan="2"></td><td colspan="3">JPEG image quality</td></tr>
<tr><td colspan="2"></td><td>Fine</td><td>Normal</td><td>Basic</td></tr>
<tr><td rowspan="5">Number of pixels</td><td>12M pixel</td><td>(2.2 MB)</td><td>1.4 MB</td><td>0.8 MB</td></tr>
<tr><td>8M pixel</td><td>1.4 MB</td><td>0.9 MB</td><td>0.5 MB</td></tr>
<tr><td>5M pixel</td><td>1.0 MB</td><td>0.6 MB</td><td>0.3 MB</td></tr>
<tr><td>3M pixel</td><td>0.7 MB</td><td>0.4 MB</td><td>0.2 MB</td></tr>
<tr><td>1M pixel</td><td>0.3 MB</td><td>0.2 MB</td><td>0.1 MB</td></tr>
</table>
• File size of a single image in various numbers of pixels and JPEG image qualites with reference to the initial setting. These values vary depending on the individual eye, photography mode, image brightness, and camera settings (such and ISO speed and sharpness).</td></tr>
<tr><td>Digital zoom</td><td colspan="2">X1 / X2
X2 can be selected only when the image size is 3 M pixel or lower.
When X2 is selected, an enlarged image of the central part is displayed.</td></tr>
<tr><td>Image size</td><td>1 / 3 / 5 / 8 / 12 M pixel
The number of pixels for displaying captured images can be changed. The file size varies depending on the settings of images.</td><td rowspan="4">: Reduce
: Increase</td></tr>
<tr><td>Contrast</td><td>-2 / -1 / 0 / +1 / +2
The contrast for displaying captured images can be changed. Changing the value to the negative side reduces the contrast and changing the value to the positive side increases the contrast.</td></tr>
<tr><td>Sharpness</td><td>0 / +1 / +2 / +3 / +4 / +5
The sharpness for displaying captured images can be changed. Increasing the value makes images sharper. However, noises also increase.</td></tr>
<tr><td>Saturation</td><td>-2 / -1 / 0 / +1 / +2
The color saturation for displaying captured images can be changed. Changing the value to the negative side reduces the intensity of colors and changing the value to the positive side increases it.</td></tr>
</table>

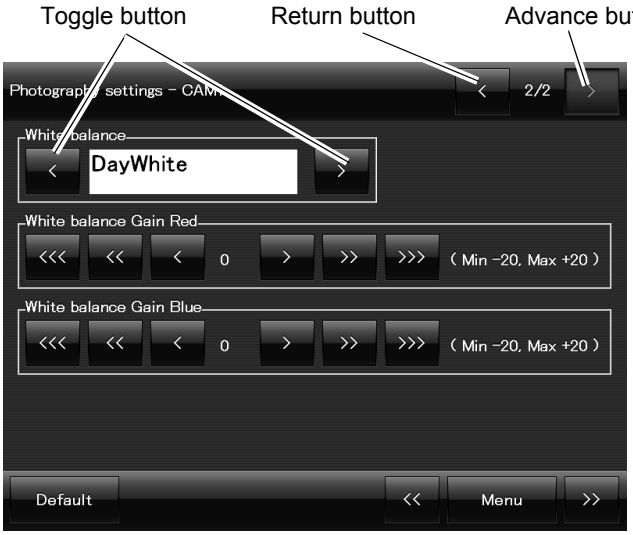
Note

• When “Digital zoom” is set to “X2”, a square mark shows the image capture area in the fundus observation screen.

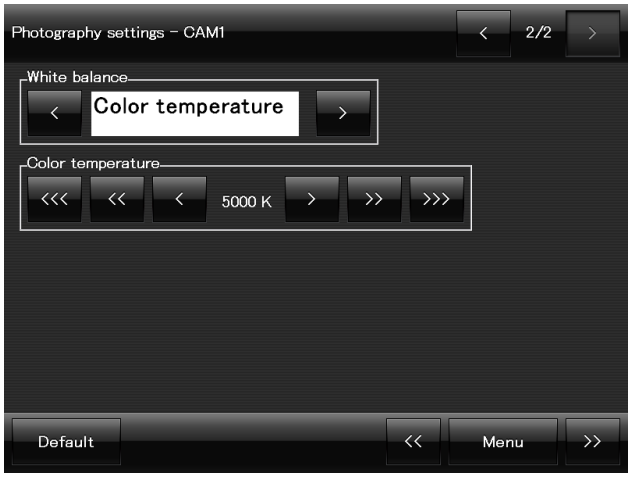
Image capture area mark



3 Press the advance button to display the 2/2 screen, then set the parameters.



When “DayWhite” is selected for “White balance”



When “Color temperature” is selected for “White balance”

* Default settings are underlined.

Item	Options	
White balance	DayWhite / Color temperature The method of changing the color for displaying captured images can be changed. Select “Color temperature” to change the color temperature. Select “DayWhite” to change the intensity of red and blue.	Select with < and >.
White balance Gain Red	When “DayWhite” is selected for “White balance” –20 – 0 – +20 Changing the value to the negative side reduces the redness of images and changing the value to the positive side increases it. The color is changed in combination with “White balance Gain Blue”.	< (>): Change in 1 increments << (>>): Change in 5 increments <<< (>>>): Change in 10 increments
White balance Gain Blue	When “DayWhite” is selected for “White balance” –20 – 0 – +20 Changing the value to the negative side reduces the blueness of images and changing the value to the positive side increases it. The color is changed in combination with “White balance Gain Red”.	

Item	Options	
Color temperature	When “Color temperature” is selected for “White balance” 4000 - 5000 - 8000 K Reducing the value makes the color of images colder. Increasing the value makes the color of images warmer.	< (>): Change in 100 increments << (>>): Change in 500 increments <<< (>>>): Change in 1,000 increments

4 When the setting is complete, press the Menu button.

The Control menu 1/2 screen is displayed, and the parameter setting for CAM 1 is complete.

To restore the default setting, press the Default button at the bottom left of the screen before pressing the Menu button.

5 If necessary, set the parameters for CAM2 and CAM3 in the same manner as for CAM1.

The default settings for CAM2 and CAM3 are the same as those for CAM1.

2.9.3 External settings and Other settings

Note

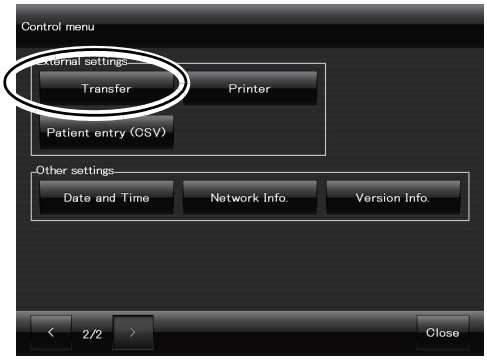
- When a PC is connected to the device via a LAN, perform the setting for the PC in advance.
- For setting of external devices to be connected, ask NIDEK or your authorized distributor.

○ Transfer

1 Press the Transfer button in “External settings”.

The Transfer screen is displayed.

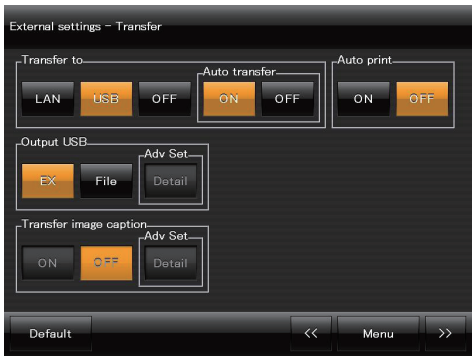
[Control menu 2/2]



2 Set the parameters for the external device to be connected.



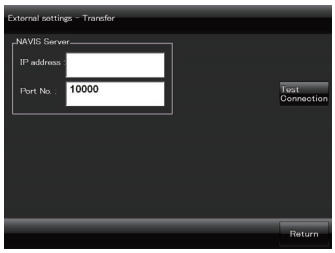
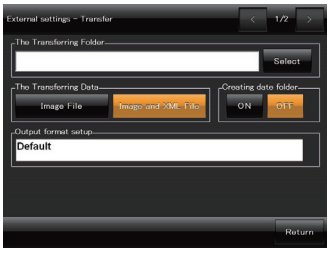
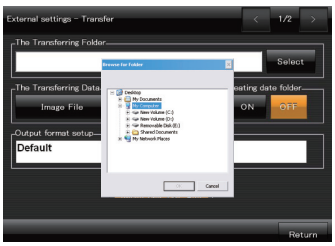
LAN is selected for “Transfer to”

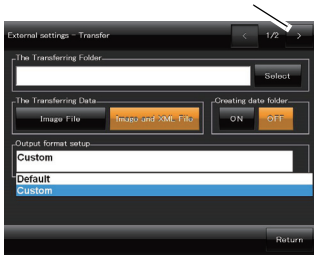
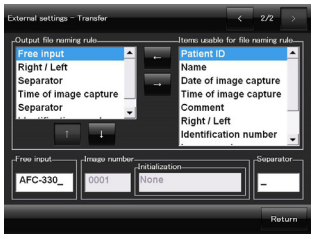


USB is selected for “Transfer to”

* Default settings are underlined.

Item		Options
Transfer to	—	LAN, <u>USB</u>, OFF Select the external device to which captured images are transferred. LAN: PC “Connect LAN to (NAVIS, File)” and “USB backup transfer” appear under “Transfer to”, and connection and setting for data backup to the USB flash drive can be set. USB: USB flash drive “Output USB” appears under “Transfer to”, and the file format for captured images can be set. OFF: Neither PC or USB flash drive
	Auto transfer	<u>ON</u> / OFF Select whether to execute automatic transfer of captured images to the connected external device (PC or USB flash drive) at the same time as saving them in the device. When OFF is selected for the selection of the external device, the Auto transfer buttons are disabled (with the characters turning to gray).

<table>
<tr><th colspan="2">Item</th><th>Options</th></tr>
<tr><td rowspan="2">Connect LAN to
(NAVIS, FILE)</td><td>EX
(When NIDEK image filing software NAVIS-EX is used)</td><td>The IP address and the port number need to be set.
Pressing the Detail button in “AdvSet” displays the screen shown below.
1) Press the blank IP address box.
The keyboard appears.
2) Input the IP address, then press the OK button on the keyboard.
The Transfer (NAVIS-EX) screen is displayed with the input IP address.
3) Input the port number in the same manner as the IP address.
4) Press the “Test Connection” button to confirm the LAN connection.
5) Press the return button to display the Transfer screen.
</td></tr>
<tr><td>File
(When NIDEK image filing software NAVIS-EX is not used)</td><td>The destination folder and file format need to be set.
Pressing the Detail button in “AdvSet” displays the screen shown below.
The Transferring Folder
There are two methods to input the folder to which data is to be transferred.
1)-1. Press the blank box of “The Transfer Folder”.
The keyboard appears.
1)-2. Input the folder name, then press the OK button.
The Transfer (File) screen is displayed with the input folder name.
2)-1. Press the Select button.
The window as shown to the right appears.
2)-2. Select the folder in the window, then press the OK button.


Note
• Select any shared folder of the network-connected PC as the output folder.
(Select a folder under My Network Places.)
• If the selected destination folder is not displayed in the “The Transferring Folder” box, directly input the destination folder name with Steps 1)-1 and 1)-2 above.
The Transferring Data: Image File/Image and XML File
Select the data to be transferred from the following two options:
Image File: File with only image data (JPEG)
Image and XML File:
File with image data (JPEG) and image information XML data
Creating date folder: ON / OFF
Creation of a date folder in the folder specified in “The Transferring follder”. When ON is selected, the date folder is automatically created in the folder specified in “The Transferring folder”, and images and xml files are transferred to that folder.
Example of folder name: YYYYMMDD
YYYY: Four-digit expression of year
MM: Two-digit expression of month
DD: Two-digit expression of day</td></tr>
</table>

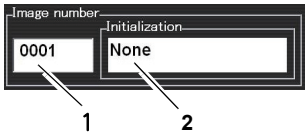
Item		Options
Connect LAN to (NAVIS, FILE)	File (When NIDEK image filing software NAVIS-EX is not used)	Output format setup: Default/Custom Default: Same file name as the one transferred to NAVIS-EX Custom: Selected to change the file name. Selecting “Custom” enables the Advance button at the top right of the screen, and Page 2/2 can be displayed. Only when “Custom“ is selected, there is Page 2/2.  **Page 2/2 when Custom is selected (screen shown to the right)**  Output file naming rule: Left box: Items and order in file name Right box: Available items for naming rule Patient ID, Name, Date of image capture, Time of image capture, Comment, Right / Left, Identification number, Image number, Free input, Separator <u>To add items</u> Select any items from the right box, then press “ ← ” to add them to the left box. <u>To delete items</u> Select any items from the left box, then press “→” to delete them. <u>To change order of items</u> Select any items from the left box, then press “ ↓ ” to move it down (back). Pressing the “ ↑ ” button moves the item one position up (front). **⚠ CAUTION** • Be sure to set the output file naming rule to avoid assigning the same file name to different files. When the file name duplication occurs, transferring of captured images fails. Free input: The desired characters can be input. (A maximum of 10 double-byte or 20 single-byte characters) Available only when “Free input” is selected for “Output file naming rule”. 1) Press the blank box. The keyboard appears. 2) Input the desired characters, then press the OK button on the keyboard. The input characters become effective as “Free input” characters.

<table>
<tr><th colspan="2">Item</th><th>Options</th></tr>
<tr><td>Connect LAN to (NAVIS, FILE)</td><td>File
(When NIDEK image filing software NAVIS-EX is not used)</td><td>
Image number:

Sequential number assigned to each captured image

Available only when “Image number” is selected for “Output file naming rule”.

1: The current image number is displayed. The number increases each time an image is captured.



The current image number and the number of digits can be changed. (A maximum of 9 digits)

1) Press the blank box.

The keyboard appears.

2) Input the desired numbers, then press the OK button on the keyboard.

The input number becomes effective as “Image number”.

2: It can be selected whether or not to initialize the image number.

None: The image number is not initialized.

Change of date: The image number is initialized to 0001 when the date is changed within the device. (The number of zeros for filling empty fields changes depending on the number of digits.)

Separator:

The separator can be changed to the desired characters.

(A maximum of 10 double-byte or 20 single-byte characters)

Available only when “Separator” is selected for “Output file naming rule”.

1) Press the blank box.

The keyboard appears.

2) Input the desired characters, then press the OK button on the keyboard.

The input characters become effective as the separator.

Note

• For the file names in this device, do not use certain types of symbols (such as ¥, :, /) that are generally not allowed for file names in a PC environment. If any of them is used, the file cannot be output.

• Only single-byte alphanumeric characters in the comment are output in the file name (a maximum of 20 characters).

• Depending on the number of characters, a part of the input in “Free input”, “Image number”, and “Separator” may be hidden in the setting screen.

To view the hidden characters, display the keyboard.

Press the return button to display the Transfer screen.
</td></tr>
</table>

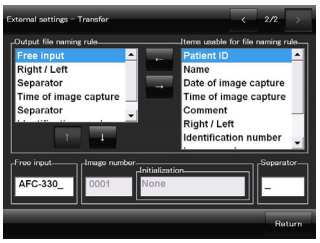
Item		Options
Connect LAN to (NAVIS, FILE)	USB backup transfer	ON, <u>OFF</u> Saving the backup output file to the USB flash drive when the “Transfer to” setting is “LAN”. When the setting is “ON”, a backup folder is automatically created in the USB flash drive, and the backup file is saved to this folder. Example of backup folder name: AFC-330_NNNNNN_Backup NNNNNN: Serial number of the device When the “Connect LAN to “ setting is “EX”: The backup file is output to the backup folder described above in a file format that can be imported by NAVIS-EX. When the “Connect LAN to“ setting is “FILE”: The date folder is automatically created in the backup folder described above, and images and xml files are transferred to that folder. Example of folder name: YYYYMMDD

<table>
<tr><th colspan="2">Item</th><th>Options</th></tr>
<tr><td rowspan="2">Output USB</td><td>EX</td><td>Data is output in a file format that can be imported to NAVIS-EX.
The Detail button in “AdvSet” is disabled.</td></tr>
<tr><td>File</td><td>The output file format can be changed.
Pressing the Detail button in “AdvSet” displays the screen shown to the right.


The Transferring Data: Image File / <u>Image and XML File</u>
Select the data to be transferred.
Image File ;
Only image data (JPEG)
Image and XML File ;
Image data (JPEG) and image information (XML)

Creating date folder: ON / <u>OFF</u>
Creation of a date folder in the USB flash drive. When ON is selected, the date folder is automatically created in the USB flash drive, and images and xml files are transferred to that folder.
Example of folder name: YYYYMMDD
YYYY: Four-digit expression of year
MM: Two-digit expression of month
DD: Two-digit expression of day

Set the output file naming rule on Page 2/2.



Output file naming rule:
Left box: Items and order in file name
Right box: Available items for naming rule
Patient ID, Name,
Date of image capture,
Time of image capture, Comment,
Right / Left, Identification number,
Image number, Free input,
Separator

<u>To add items</u>
Select any items from the right box, then press “ ← ” to add them to the left box.
<u>To delete items</u>
Select any items from the left box, then press “→” to delete them.
<u>To change order of items</u>
Select any items from the left box, then press “ ↓ ” to move it down (back).
Pressing the “ ↑ ” button moves the item one position up (front).

⚠ CAUTION • Be sure to set the output file naming rule to avoid assigning the same file name to different files.
When the file name duplication occurs, transferring of captured images fails.</td></tr>
</table>

<table>
<tr><th colspan="2">Item</th><th>Options</th></tr>
<tr><td rowspan="2">Output USB</td><td>File</td><td>
Free input:

The desired characters can be input. (A maximum of 10 double-byte or 20 single-byte characters)

Available only when “Free input” is selected for “Output file naming rule”.

1) Press the blank box.

The keyboard appears.

2) Input the desired characters, then press the OK button on the keyboard.

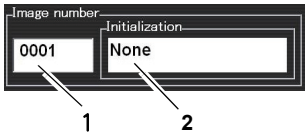
The input characters become effective as “Free input” characters.

Image number:

Sequential number assigned to each captured image

Available only when “Image number” is selected for “Output file naming rule”.

1: The current image number is displayed. The number increases each time an image is captured.



The current image number and the number of digits can be changed. (A maximum of 9 digits)

1) Press the blank box.

The keyboard appears.

2) Input the desired numbers, then press the OK button on the keyboard.

The input number becomes effective as “Image number”.

2: It can be selected whether or not to initialize the image number.

None: The image number is not initialized.

Change of date: The image number is initialized to 0001 when the date is changed within the device. (The number of zeros for filling empty fields changes depending on the number of digits.)

Separator:

The separator can be changed to the desired characters.

(A maximum of 10 double-byte or 20 single-byte characters)

Available only when “Separator” is selected for “Output file naming rule”.

1) Press the blank box.

The keyboard appears.

2) Input the desired characters, then press the OK button on the keyboard.

The input characters become effective as the separator.

Note

• For the file names in this device, do not use certain types of symbols (such as ¥, :, /) that are generally not allowed for file names in a PC environment. If any of them is used, the file cannot be output.

• Only single-byte alphanumeric characters in the comment are output in the file name (a maximum of 20 characters).

• Depending on the number of characters, a part of the input in “Free input”, “Image number”, and “Separator” may be hidden in the setting screen.

To view the hidden characters, display the keyboard.

Press the return button to display the Transfer screen.
</td></tr>
<tr><td colspan="2">Auto print</td><td>ON / <u>OFF</u>
Automatic printing of captured images at the same time as saving of them.</td></tr>
</table>

Item		Options
Transfer image caption	When the "Connect LAN to" or "Output USB" setting is "FILE":	ON / <u>OFF</u> Caption superimposition on transferred captured image Note • Caption superimposition on captured images is not available when the "Connect LAN to (NAVIS, FILE)" or "Output USB" setting is "EX". When the setting is as described above, the characters on the buttons for "Transfer image caption" become grayed. Pressing "ON" enables the Detail button in "Adv Set". Pressing the Detail button displays the screen shown below. Font Size: <u>Default</u> / Size Setting for caption size Size: 1% to 15% Default setting: 5% When "Default" is selected, the caption size is the same as when "5%" is specified with the "Size" setting.  › › : Pressed change the caption size by 1 %. Upper left: Captions to be superimposed at the top left of the captured image can be selected. (Two caption items can be selected for two rows.) Caption items can be changed in the order shown below by pressing the › button. (› button changes the items in the reverse order.) "None" → "Patient ID" → "Name" → "Right/Left" → "Sex" → "Age" → "Date and time of image capture" → "Image Type 1" → "Image Type 2" → "Operator's ID" → "Date of image" → "Time of image" → "Image number" Default setting: First row - Patient ID, Second row - None Image Type 1: Caption superimposition of image capture mode type on transferred captured images Normal photography mode: NORMAL Stereo photography mode: STEREO Panorama photography mode: PANORAMA Anterior eye photography mode: ANTERIOR Image Type 2: Caption superimposition of patient eye (right or left) and information in STEREO or PANORAMA photography on transferred captured images (See "2. Eye (right or left)" in " [Captured image information]" (Page 30).) Upper right: Captions to be superimposed can be specified in the same manner as "Upper left". Default setting: First row - Name, Second row - None Lower left: Captions to be superimposed can be specified in the same manner as "Upper left". Default setting: First row - None, Second row - Right/Left

Item		Options
Transfer image caption	When the “Connect LAN to” or “Output USB” setting is “FILE”:	Lower right: Captions to be superimposed can be specified in the same manner as “Upper left”. Default setting: First row - Time of image capture, Second row - Date of image capture Setting copy (Printer): Pressing the Copy button changes the current caption superimposition settings to the ones specified in Page 1/2 of “External settings - Printer” screen. Press the return button to display the Transfer screen.

3 When the setting is complete, press the Menu button.

The Control menu 2/2 screen is displayed.

Note

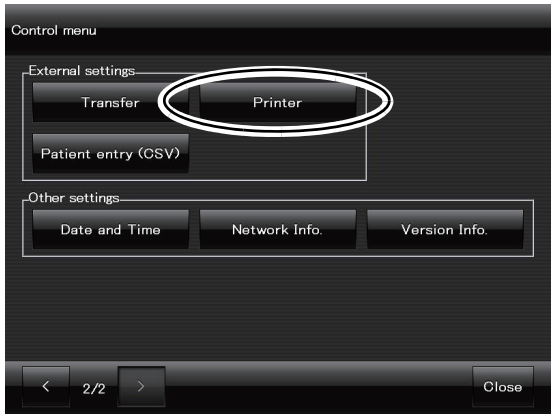
- Pressing the Default button does not change the output destination folder, file format, IP address, or port number set by pressing the AdvSet button.

○ Printer

1 Press the Printer button in “External settings”.

The Printer screen is displayed.

[Control menu 2/2]



2 Set the parameter for printing in the Printer 1/2 screen.



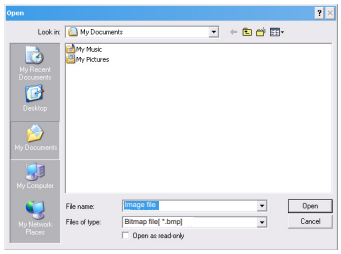
* Default settings are underlined.

Item	Options	
Font Size	Default / Size Size of the printer characters Size: 1%- 15% “Default” is the same as 5% of “Size”.	< , > : Change in 1% increments
Setting copy (Transfer)	Press the Copy button.	Changes the current print settings to the ones specified in the Sdv Set screen for “Transfer image caption” in the “External settings - Transfer” screen.
Upper left	Items to be displayed at the top left of the print screen (Two items can be displayed in two rows.) The items can be changed by pressing the > button as follows: None → Patient ID → Name → Right/Left → Sex → Age → Date and time → Image Type1 → Image Type2 → Operator’s ID →Date of image →Time of image → Image number (Default—Upper row: Patient ID, Lower row: None Image Type 1: Photography mode Normal photography mode: NORMAL Stereo photography mode: STEREO Panorama photography mode: PANORAMA Anterior eye photography mode: ANTERIOR Image Type 2: Eye (right/left) and Stereo or Panorama photography information See 2. Eye (right or left) in “[Captured image information]” (page 30).	< : Previous option > : Next option
Upper right	Items to be printed selected in the same manner as “Upper left” (Default: “Name” for upper row and “None” for lower row)	
Lower left	Items to be printed selected in the same manner as “Upper left” (Default: “None” for upper row and “Right/Left” for lower row)	
Lower right	Items to be printed selected in the same manner as “Upper left” (Default: “Time of image” for upper row and “Date of image” for lower row)	

3 Set the parameter for printing of a logo, select the logo, and preview the printed image.



* Default settings are underlined.

Item	Options
Print logo	ON / <u>OFF</u> Printing of logo
Logo	Selection of the logo to be printed The default logo is the one displayed at the device startup. 1) Save the logo data to be used in the USB flash drive in advance. The image format and size are as follows: Image format: bmp, Size: 200 (vertical) × 200 (horizontal) (pixel) 2) To change the logo, press the Select button. The Windows screen is displayed.  3) Press ▼ of the “Look in” box in the Windows screen, then select the USB flash drive from the tree. Files in the USB flash drive are displayed. 4) Open the file of the desired logo, then press the Open button at the bottom right of the screen. The Windows screen is closed and the 2/2 screen is displayed. The selected logo is displayed in the Logo frame. Restoring the initial logo 1) Press the Select button. The Windows screen appears. 2) Press ▼ of the “Look in” box in the Windows screen, then select “New Volume [D:]” from the tree. Files in “New Volume [D:]” are displayed. 3) Open the “Data” file. 4) Select “Default_Logo_JP.bmp”, then press the Open button at the bottom right of the screen. The Windows screen is closed and the 2/2 screen is displayed. The selected logo is displayed in the Logo frame.

Item	Options
Show one image/ Show two images	Preview the printed image with the procedure below. 1) Press “Show one image” or “Show two images” to open the preview screen. Show one image: Preview for when a single image is printed in a single sheet of paper Show two images: Preview for when two images are printed in a single sheet of paper 2) After confirming the preview image, press the Exit button at the bottom right of the screen. The 2/2 screen is displayed.

4 To change the parameters after confirming the preview image, return to Step 2.

5 When the parameter setting is complete, press the Menu button.

The Control menu 2/2 screen is displayed.

○ Patient registration (CSV)

Patient information can be registered using CSV files.

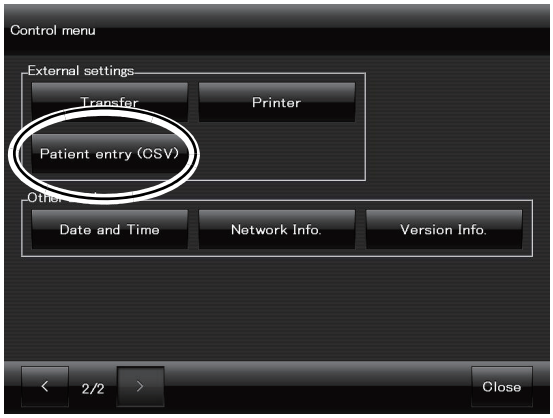
Note

- For the device setting to allow use of CSV files, ask NIDEK or your authorized distributor.

1 Press the Patient entry (CSV) button in “External settings”.

The Patient entry (CSV) screen is displayed.

[Control menu 2/2]

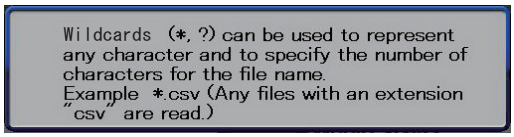


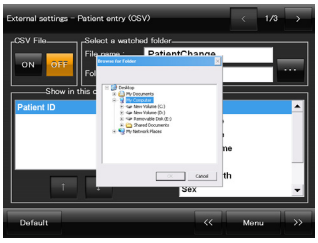
2 In Page 1/3, set the necessary parameters.

Parameters in Page 1/3 are as shown below.



* Default settings are underlined.

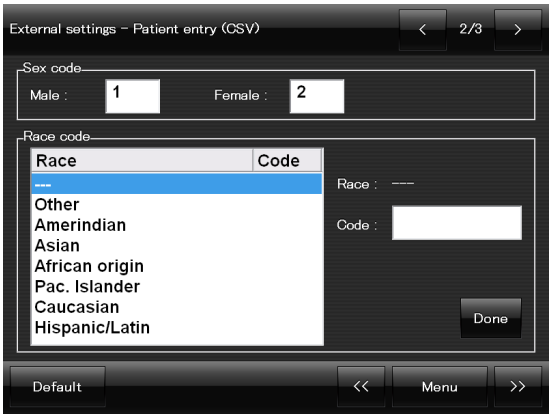
<table>
<tr><th colspan="2">Item</th><th>Options</th></tr>
<tr><td colspan="2">CSV File</td><td>ON /<u>OFF</u>
Use of CSV files for patient registration is toggled.</td></tr>
<tr><td rowspan="2">Select a watched folder</td><td>File name</td><td>File name:<u>PatientChange</u>(Default)
The CSV file name is set.
1) Press the blank “File name” box.
The message shown below appears.


For the wild card, * and ? can be used.
*: Characters with any length
?: The same number of characters as the number of this symbol or less.
(ex.: If there are two “?”, the number of characters is two or less.)
2) Press the screen.
The message disappears and the keyboard appears.
3) Input the file name, then press the OK button on the keyboard.
The file name is set.</td></tr>
<tr><td>Folder name</td><td>Set the folder that contains the CSV file.
There are two methods to input the folder to which data is to be transferred.
1)-1. Press the blank box of “The Folder name”.
The keyboard appears.
1)-2. Input the folder name, then press the OK button.
The folder name is set.
2)-1. Press the “•••” button.
The window as shown to the right appears.
2)-2. Select the folder in the window, then press the OK button.
The folder name is set.


Note
• Select any shared folder of the network-connected PC as the watched folder.
(Select a folder under My Network Places.)
• If the selected watched folder is not displayed in the “Folder name” box, directly input the watched folder name with Steps 1)-1 and 1)-2 above.</td></tr>
</table>

Item	Options
Show in this order Hide	Set items to be used for CSV files. Patient ID is compulsory. Left box: Show in this order Right box: Hide  To add items to be used Select the desired items from the right box, then move them to the left box by pressing the ← button. To delete items to be used Select the desired items from the left box, then move them to the right box by pressing the → button. To change order of items to be used Select the desired items from the left box, then move them up (forward) and down (backward) using the ↑ and ↓ buttons. Available items Patient ID, (None), Last Name, First Name, Middle Name, AutoName, Date of Birth, Sex, Comment, History, Race (None) means items ignored by the device. Example—In case of “Patient ID, (None), Last Name”, the second area is ignored. When “AutoName” is selected, a single-byte space separates the first, middle and last names. The order of the first, middle and last names is in accordance with “Show names by” of “Software Settings”.

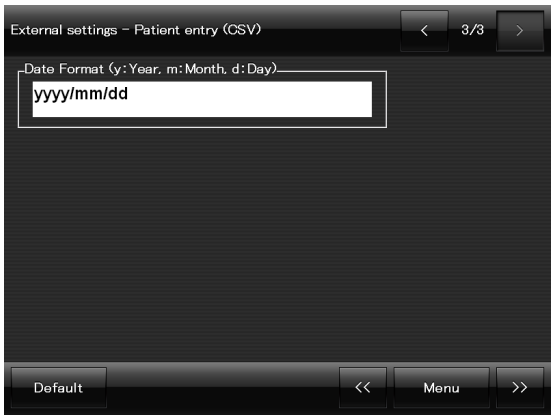
3 In Page 2/3, set sex and race codes for the patient.



Item	Options
Sex code	Press the blank Male or Female box, then input the sex code using the on-screen keyboard. (A maximum of 20 single-byte characters) Default setting - Male: 1, Female: 2

Item	Options
Race code	1) From the left box, select the race for which a code is to be specified, then press the blank Code box on the right. The on-screen keyboard appears. 2) Input the race code, then press the OK button on the keyboard. Page 2/3 is displayed, and the input race code appears on the side of “Race”. 3)Press the “Done” button. The race code is reflected on the left box. Default setting - Race: ---, Code: None for all races (blank)

4 Set the date format in Page 3/3.



Item	Options
Date Format (y:Year,m:Month,d:Day)	Pressing the yyyy/mm/dd box displays the pull-down menu that allows selection of the desired date format from the ones shown below. yyyy/mm/dd mm/dd/yyyy dd/mm/yyyy yyyy-mm-dd mm-dd-yyyy dd-mm-yyyy yyyy.mm.dd mm.dd.yyyy dd.mm.yyyy Default setting - yyyy/mm/dd

5 When the parameter setting is complete, press the Menu button.

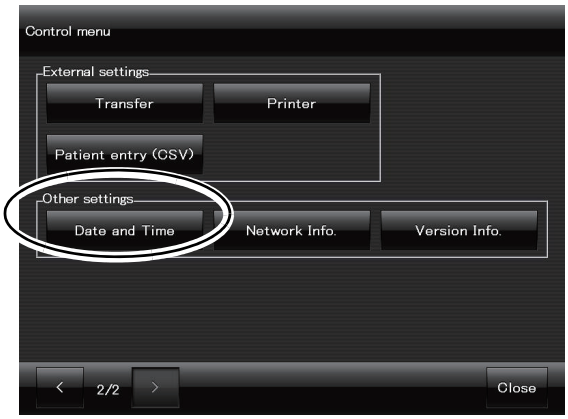
The Control menu Page 2/2 is displayed.

○ Date and Time

1 Press the Date and Time button in “Other settings”.

The Date and Time screen is displayed.

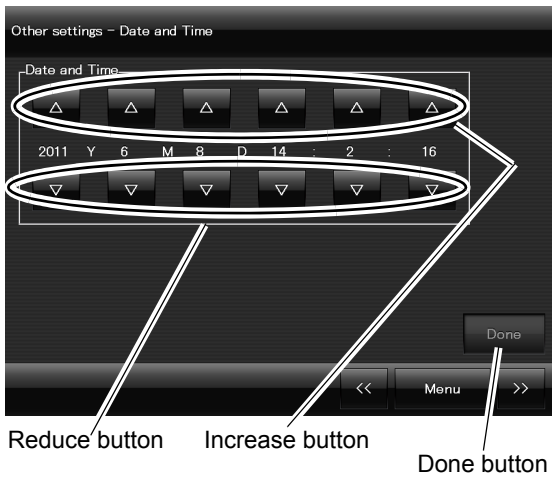
[Control menu 2/2]



2 Set year, month, and day using the increase △ and reduce ▽ buttons.

Year: Four digits

Time: In 24-hour notation



3 When the setting is complete, press the Done button.

The clock starts.

4 When the setting is complete, press the Menu button.

The Control menu 2/2 screen is displayed.

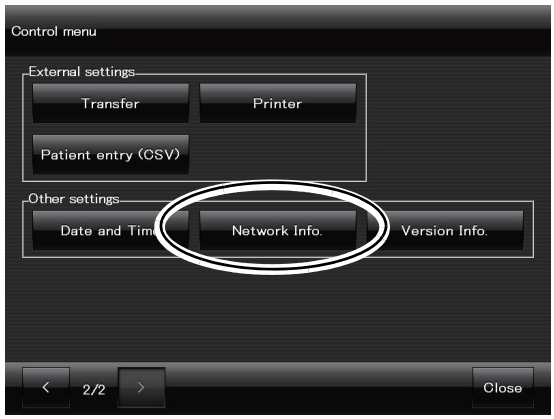
○ Network info.

In the Network Info. screen, the network setting can be confirmed. In addition, the communication between the device and the connected PC can be checked using the ping command.

1 Press the Network Info. button in “Other settings”.

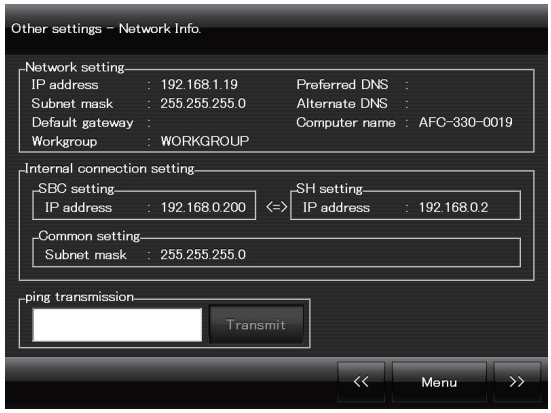
The Network Info. screen is displayed.

[Control menu 2/2]



2 Check the network information for the device.

The network information shown to the right is an example.



3 To check the communication using the ping command, press the blank “ping transmission” box.

A keyboard for ping transmission appears.

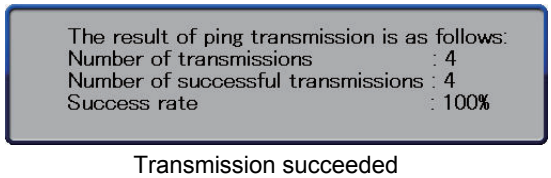
4 Input the IP address of the connected PC, then press “OK”.

In the “ping transmission” box, the IP address of the PC is displayed.

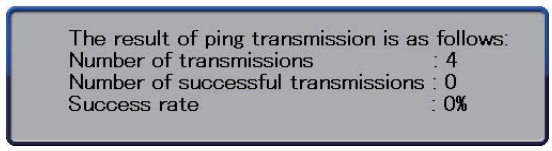
5 Press the Transmit button to transmit the ping command.

The result of the transmission is displayed.

Press the display to return to the Network Info. screen.



Transmission succeeded



Transmission failed

Note

- If the ping transmission failed, check the connection of the LAN cable and the IP address. If the ping transmission still fails, contact NIDEK or your authorized distributor.

6 When checking of the communication is finished, press the Menu button.

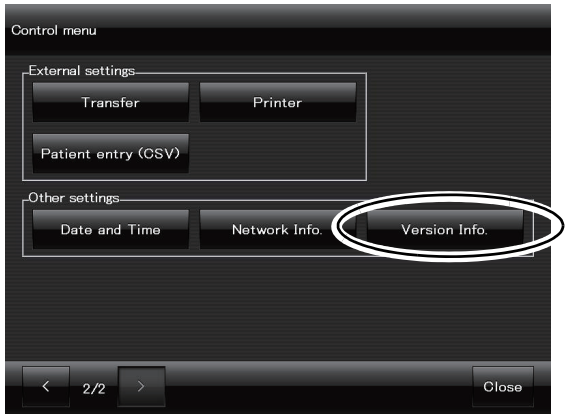
Page 2/2 of the “Control menu” screen is displayed.

○ Version Info

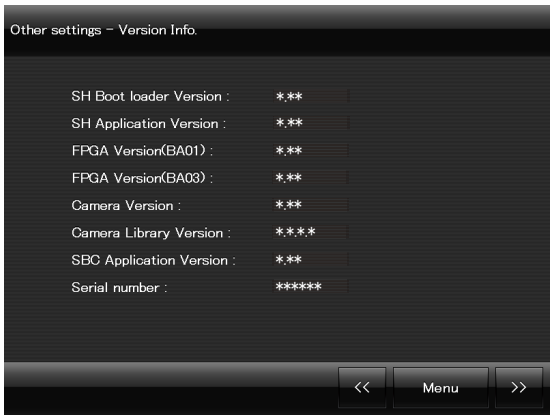
1 Press the Version Info button in “Other settings”.

The Version Info screen is displayed.

[Control menu 2/2]



2 Confirm the version information of the device.



3 When the version information is confirmed, press the Menu button.

The Control menu 2/2 screen is displayed.

3. OPERATION FOR WHEN PERIPHERAL DEVICES ARE CONNECTED

The device can be connected with a USB flash drive and a printer to store and print captured images. In addition, the device can be connected with a PC via a LAN to transfer captured images.

⚠ CAUTION

- **Before connecting or disconnecting a LAN-connected PC to or from the device, be sure to turn off power to the device and the external devices.**
 If connection or disconnection is executed with power to the devices on, failure of them may result.
- **Before connecting or disconnecting a USB device to or from the device, be sure to follow the instruction of "3.1.1 Connection, disconnection, and use of USB flash drive" (page 140) and "3.1.2 Connection, disconnection, and use of printer" (page 143).**
 The device may malfunction or data in the USB flash drive may become corrupted.
- **Equipment connected to the analog or digital interfaces must be certified according to the representative appropriate national standards (such as EN 60601-1 and IEC60601-1). Furthermore, all configurations must comply with the system standard IEC60601-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1. If in doubt, consult the technical service department of your local representative.**

3.1 Connection of USB devices

Outline

When USB devices are connected to the USB port, the following operation becomes available:

•USB flash drive—Transfer of captured images from the device to the USB flash drive

•Printer—Printing of captured images directly from the device

Note

- Before using a USB device, the USB driver needs to be installed.
- The device is equipped with two USB ports. The USB driver needs to be installed for each port.
 If the USB device is connected to a USB port for which the USB driver has not been installed, the USB device may not be recognized.
- For installation of the USB driver for a USB flash drive or a printer, ask NIDEK or your authorized distributor.

3.1.1 Connection, disconnection, and use of USB flash drive

⚠CAUTION

- **Each time before connecting a USB flash drive to the device, be sure to check it for viruses.**
 If the device is infected with a virus and any problem occurs, NIDEK does not assume responsibility or compensate for damages.
- **Be sure to connect or disconnect a USB flash drive with power to the device turned off or with the USB Flash Drive Settings screen displayed.**
 The device may malfunction or data in the USB flash drive may become corrupted.

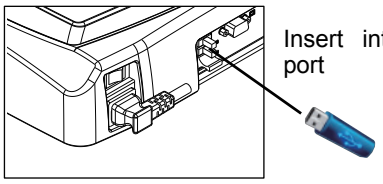
Note

- Be sure to consult with NIDEK or your authorized distributor when purchasing a USB flash drive.

○ Connection

Connection of a USB flash drive when power to the device is off

1 With the device power turned off, insert the USB flash drive into the USB port.

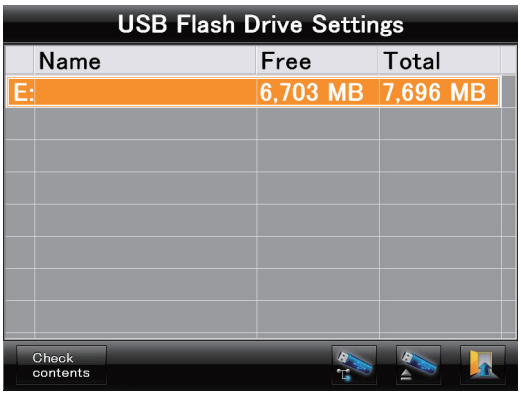


2 Turn on power to the device.

When startup of the device is complete, connection of the USB flash drive is also complete.

Click the USB flash drive button  in the Photography settings menu screen, the thumbnail screen, or the review screen to check the connection of the USB flash drive.

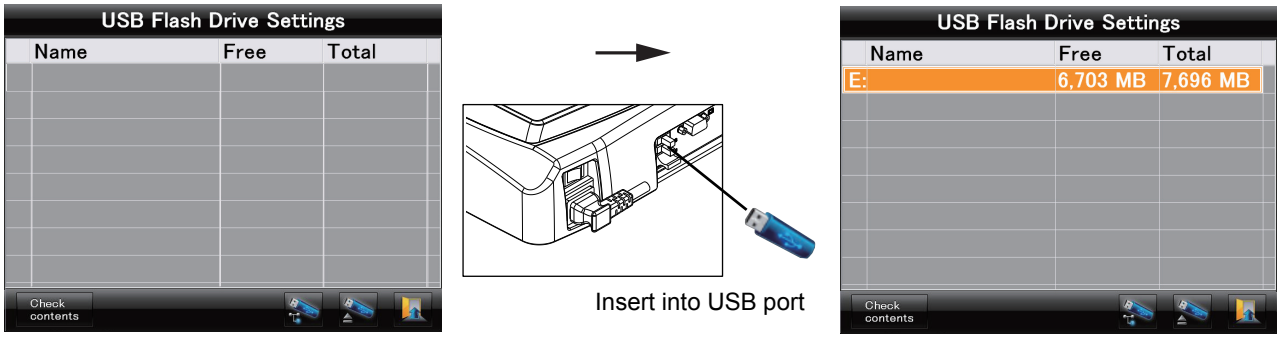




Connection of a USB flash drive when the USB Flash Drive Settings screen is displayed

1 Click the USB flash drive button  to show the USB Flash Drive Settings screen.

2 With the device power turned off, insert the USB flash drive into the USB port.



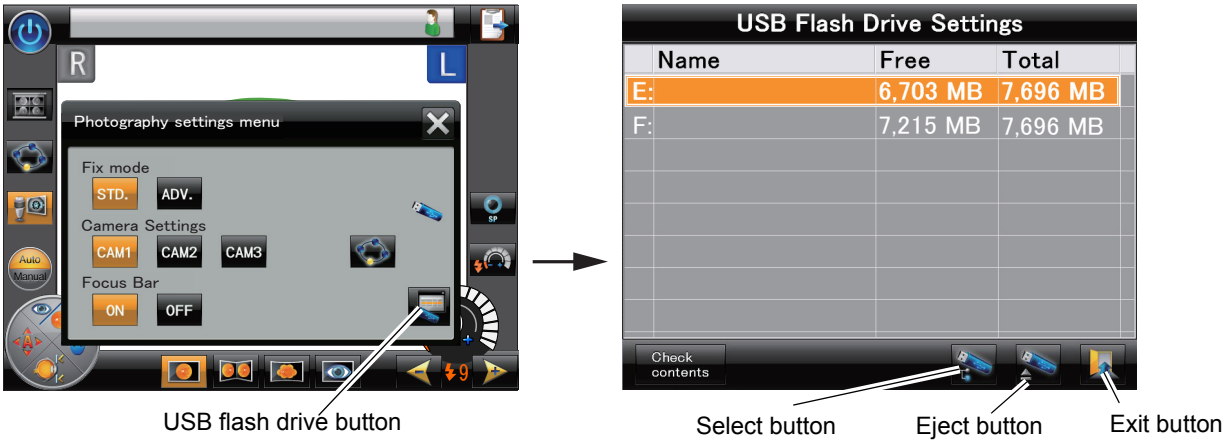
○ Disconnection

A USB flash drive can be disconnected from the device after turning off power to the device, or when the device power is on as described below.

Disconnection of a USB flash drive when the USB Flash Drive Settings screen is displayed

1 Click the USB flash drive button  in the Photography settings menu screen, the thumbnail screen, or the review screen.

The USB Flash Drive Settings screen is displayed.



2 Select the USB flash drive to be disconnect from the device by pressing the row of the desired USB flash drive.

The selected USB flash drive is indicated with a white frame.

3 Press the eject button .

The selected USB flash drive disappears from the list of the USB Flash Drive Settings screen.

The selected USB flash drive is disconnected and can be removed from the device.

4 Press the exit button .

The anterior eye observation screen is displayed.

○ Use

Use of the device with a USB flash drive is the standard use of the device, and connection of a USB flash drive is the default setting.

Pressing the OK/Auto transfer button  in the preview screen or the transfer button  in the thumbnail screen transfers captured images and their information is transferred to the USB flash drive. Data as shown below are transferred (saved). The data name shows the type of data.

For details of the format of files to be transferred, see “Output USB” (Page 126) in “○ Transfer”.

Switching USB flash drives

When two USB flash drives are connected to the device, the destination of file transfer can be switched with the Select button .

1) Select the line for the USB flash drive to specify as the data transfer destination.

 The selected USB flash drive is indicated with a white frame.

2) Press the Select button.

 The selected USB flash drive is highlighted in orange, and becomes the data transfer destination. (The orange highlight indicates the data transfer destination.)

Confirming contents of USB flash drives

The data in the USB flash drive can be viewed by pressing the Check contents button at the bottom left of the USB Flash Drive Settings screen.

1) Select the line for the USB flash drive to view the contents.

 The selected USB flash drive is indicated with a white frame.

2) Press the Check contents button.

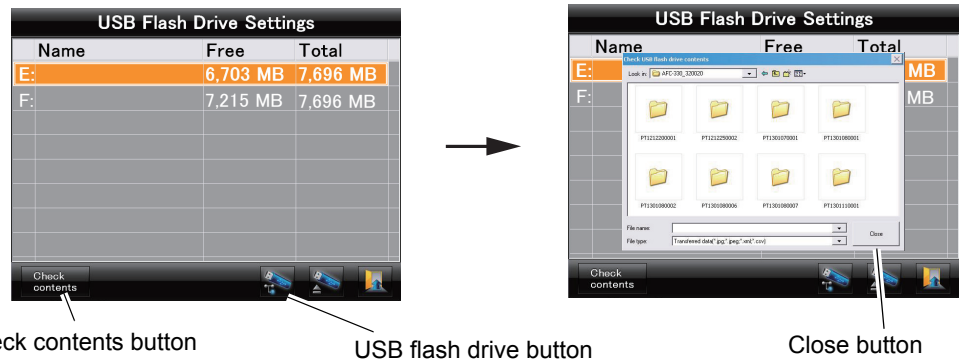
 The “Check USB flash drive contents” window appears.

3) Double-click the desired folder being displayed.

 The list of files in the folder is displayed.

4) Press the Close button.

 The “Check USB flash drive contents” window disappears.

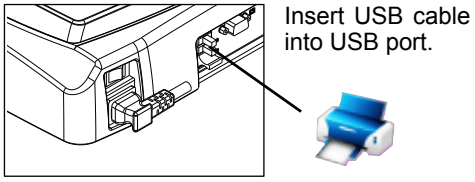


3.1.2 Connection, disconnection, and use of printer

○ Connection

1 After confirming that the device and printer power is off, then connect the USB cable of the printer to the USB port of the device.

2 Turn on power to the printer, then to the device.



○ Disconnection

1 Turn off power to the device, then the printer.

○ Use

1 Select captured images in the thumbnail screen or display them in the preview screen.

2 Press the print button  .

The specified image is printed.

For the printer setting for the device, see “○ Printer” (Page 129).

Note

- Be sure to consult with NIDEK or your authorized distributor when purchasing a printer.

3.2 Connection of PC

Outline

All image capture data can be transferred to a LAN-connected PC.
Data transferred to the PC can be managed using image filing software such as NIDEK NAVIS-EX.

3.2.1 Network connection (LAN)

⚠CAUTION

- **When connecting to peripheral equipment like a PC with LAN connector via a medical facility network, insert or connect the isolation transformer between medical electrical equipment and the networked device (such as HUB), or the networked device and any other electrical equipment.**

 Depending on the types or numbers of other electrical equipment connected to the network, electric shock or malfunction/failure of the electrical equipment may occur. For installation of the network isolation transformer, consult NIDEK or your authorized distributor.

- **If the PC of this system is connected by LAN to other devices such as an external computer via a network of the medical facility, do not connect the system to a network that can connect to the Internet.**

 Be sure to configure the local network only with PCs installed with NIDEK's image filing software (such as NAVIS-EX). NIDEK will not assume responsibility or compensate for damages caused by any virus infection and development.

- **When the device used in connection with NAVIS-EX is turned off, be sure to wait at least two minutes before turning on the device again.**

 In rare cases, the device startup becomes slow and ERROR 31 occurs.
 In such a case, turn off the device power, then turn it on again.

- **Be sure that the LAN cable is securely connected.**

 If the device is disconnected from the network during operation with LAN connection, the device may not operate properly.

Note

- If any patient data set that includes any special characters (that cannot be input using the software keyboard) is imported with software such as NAVIS-EX, they may become unreadable in the screen.
- The network connection between the device and PCs that run on Mac OS is not guaranteed.

 (Mac OS is a registered trademark of Apple Inc. in the U.S.A. and other countries.)

○ Connection

1 Connect the device to the network.

Connect the device to the network via LAN to which the PC at the receiving end is connected.

2 Turn on power to the PC, then to the device.

3 Set parameters for the device and the PC after obtaining permission from the network administrator of the facility.

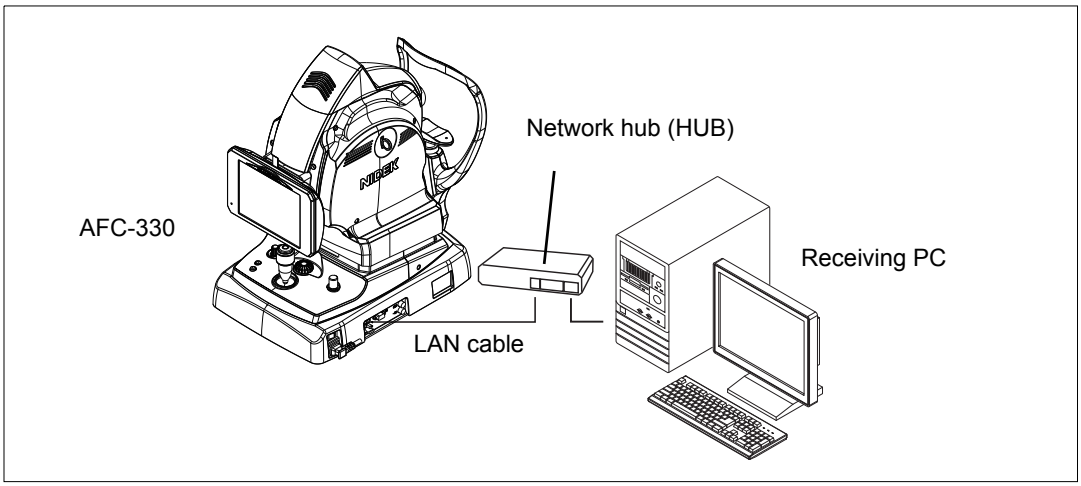
For details of the parameter setting, see “○ Transfer” (Page 121).

Entrust the connection to service personnel of NIDEK or your authorized distributor.

4 Check the connection between the device and the PC.

There are two methods to check the connection.

1) After inputting the IP address of the PC in the Network Info. screen, transmit the ping command by pressing the Transmit button. (“○ Network info.” (Page 137)
2) When the device is connected to the NAVIS-EX, input the IP address and such in the “External settings—Transfer (NAVIS-EX)” screen, then press the “Test Connection”. (“○ Transfer” (Page 121).



Note

- When the device is disconnected with NAVIS-EX, the following message appears:
 NAVIS-EX has been disconnected.
 Would you like to reconnect to NAVIS-EX?

When connecting the device with NAVIS-EX again, check the LAN cable and the receiving PC to make sure that the device and the PC are properly connected, then press the Yes button on the screen.

○ Use

1 Turn on power to the PC, then to the device.

2 Activate image filing software such as NAVIS-EX.

3 Capture images with the same procedure as “2.1 Operation Overview” (page 53).

4 To save or transfer captured images in the preview screen, press the OK/Auto transfer button . For images that has not been saved yet, select them in the thumbnail screen, then press the transfer button .

Captured images and information are transferred to the PC.

When NAVIS-EX is used

Data is transferred in the NAVIS-EX file format.

When NAVIS-EX is not used

Data is transferred to the specified destination folder with the specified file name and file format.

For details of the setting, see “○ Transfer” (Page 121).

4. MAINTENANCE

4.1 Troubleshooting

If the device does not function properly, troubleshoot with the table below before contacting NIDEK or your authorized distributor for repairs.

Symptom	Remedy
Turning on power to the device does not illuminate the pilot lamp or turn on LCD touch-screen.	• The power cord may not be plugged. Securely plug the power cord again.
The LCD touch-screen suddenly blacks out.	• If the pilot lamp is blinking, the device is in Sleep mode. Operate any control of the device.
The main unit cannot be moved horizontally.	• The main unit may be locked by the main unit locking knob. Turn the main unit locking knob to release the lock.
The halogen lamp for observation does not illuminate. **The xenon flash lamp does not illuminate.**	• Only properly trained service personnel are allowed to replace the halogen or xenon flash lamp. Contact NIDEK or your authorized distributor. For replacement parts, see “O Parts to be maintained by service personnel” (page 157).

Symptom	Remedy
Auto tracking cannot be executed.	• The auto tracking may not be enabled (ON). Enable the auto tracking and set Auto with the Auto/Manual toggle button. • If the patient's eyelid is covering the patient's eye, the black-and-white required pupil diameter detection mark is displayed and the auto tracking does not function. In such a case, instruct the patient to open their eyes wider. If that is not possible, raise the eyelid with a finger while paying attention not to press the eyeball. • Extraneous light may be exposed to the cornea. (In such a case, the cornea-reflected spots cannot be detected and the black-and-white required pupil diameter detection mark is displayed.) Reduce the light intensity of the room or install the device on another location. • The auto tracking may not function for eyes with keratoconus or immediately after surgery. (In such a case, the cornea-reflected spots cannot be detected and the black-and-white required pupil diameter detection mark is displayed.) Perform manual alignment. • The auto tracking may not function when movement of the eye or face cannot be stopped. In such a case, perform manual alignment.
Auto focus does not function.	• The auto focus may not function for eyes with eye diseases such as cataract or severe myopia or hyperopia outside the range between −12 D and +15 D. In such a case, adjust the focus using the focus knob. See "O If auto focus is not activated" (page 64).
Auto shot cannot be executed. Images cannot be captured using the release button.	• When the auto anti-misshooting button is enabled, image capture cannot be executed with the auto shot or by pressing the release button if the patient's eyelid is detected or their pupil size does not satisfy the required pupil diameter (minimum pupil diameter in Small pupil photography mode) (). • In such a case, instruct the patient to open their eyes wider. If that is not possible, raise the eyelid with a finger while paying attention not to press the eyeball. • If image capture cannot be executed with the remedies above, disable the auto anti-misshooting button , or set Manual with the Auto/Manual toggle button , then perform image capture again.
Captured images are dark.	• Increase the flash intensity using the flash intensity up/down buttons, then perform image capture again.
Quality of captured images is low. Intense white-light flare appears in the center.	• Check the cleanliness of the objective lens. If it is not clean, clean it. (See "4.3 Cleaning Objective Lens" (page 155).)

Symptom	Remedy
The internal fixation lamp is blurred.	• Check again without the compensation lens. When a compensation lens is inserted, the internal fixation lamp becomes blurred to some extent.
The external fixation lamp does not illuminate.	• Check that the external fixation lamp unit is securely connected to the external fixation lamp connector. Check that the external fixation lamp is enabled. (See "O External fixation lamp" (page 102).)

* If the symptom cannot be remedied by the above actions, or any message other than the above is displayed, contact NIDEK or your authorized distributor.

4.2 Error Messages and Remedies

If any message shown in the list below appears in the screen, remedy the problem following the instruction in “Cause and remedy”.
When contacting NIDEK or your authorized distributor, inform of the serial number of the device, message number, and symptom for proper service.

Message	Cause and remedy
ERROR 001: EEPROM data error	• Abnormality in data in the backup memory (EEPROM) Data may have become lost due to extraneous noise such as static electricity, or the circuit board or the backup memory (EEPROM) on the circuit board may have failed. Turn off the device power. (See “2.4 Image Capture Shutdown Procedure” (page 67)). Turn on the device power again. (See “2.2 Image Capture Preparation” (page 55)). • If the same message appears when the device power is turned on again, turn off the device power and contact NIDEK or your authorized distributor.
ERROR 002: Cover open	• Abnormality was detected in the internal structure of the device. Turn off the device power. (See “2.4 Image Capture Shutdown Procedure” (page 67).) Turn on the device power again. (See “2.2 Image Capture Preparation” (page 55).) • If the same message appears when the device power is turned on again, turn off the device power and contact NIDEK or your authorized distributor.
ERROR 003: The base temp. is too high ERROR 004: Base temperature sensor error ERROR 005: The halogen temp. is too high ERROR 006: Halogen temp. sensor error	• The temperature inside the device may have risen suddenly. • Turn off the device power and contact NIDEK or your authorized distributor.
ERROR 011: Insufficient charge ERROR 012: Charging error(4S) ERROR 013: Charging error(1S) ERROR 014: Flash sequence error	• The xenon flash lamp may fail. • Turn off the device power and contact NIDEK or your authorized distributor.
ERROR 021: QR mirror error ERROR 023: No trigger signal detected ERROR 024: Insufficient flashing	• Abnormality was detected in the internal structure of the device. Turn off the device power. (See “2.4 Image Capture Shutdown Procedure” (page 67).) Turn on the device power again. (See “2.2 Image Capture Preparation” (page 55).) • If the same message appears when the device power is turned on again, turn off the device power and contact NIDEK or your authorized distributor.
ERROR 031: Comm error: Init. failed	• Abnormality was detected in the internal structure of the device. • Turn off the device power and contact NIDEK or your authorized distributor.

Message	Cause and remedy
ERROR 032: Comm error: Timeout ERROR 033: Comm error: Invalid data	• Abnormality was detected in the internal structure of the device. Turn off the device power. (See “2.4 Image Capture Shutdown Procedure” (page 67).) Turn on the device power again. (See “2.2 Image Capture Preparation” (page 55).) • If the same message appears when the device power is turned on again, turn off the device power and contact NIDEK or your authorized distributor.
ERROR 041: Motor error: Up and down ERROR 042: Motor error: Right and left ERROR 043: Motor error: Back and forth ERROR 044: Motor error: Chinrest ERROR 045: Motor error: Focus ERROR 046: Motor error: Smaller pupil ERROR 047: Motor error: QR mirror	
ERROR 051: Cam device error: Start-up ERROR 052: Camera: Init. Failed ERROR 053: Unable to acquire images ERROR 054: Unable to read images ERROR 055: Cam device error: Idle ERROR 056: Cam device error: Photo ERROR 057: Cam device error: Image read ERROR 058: Camera setting: Timeout ERROR 060: Camera: No hardware detected	• Abnormality was detected in the internal structure of the device. • Turn off the device power and contact NIDEK or your authorized distributor.
ERROR 061: Unable to read patient DB	
ERROR 062: Unable to wright image ERROR 063: Unable to backup setup param.	• Abnormality was detected in the internal structure of the device. Turn off the device power. (See “2.4 Image Capture Shutdown Procedure” (page 67).) Turn on the device power again. (See “2.2 Image Capture Preparation” (page 55).) • If the same message appears when the device power is turned on again, turn off the device power and contact NIDEK or your authorized distributor.

Message	Cause and remedy
Message with ⚠ disappears by touching the screen.	
⚠ Patient ID has not been entered. Please enter a Patient ID.	• Image capture was attempted without selecting a patient. • Perform image capture after selecting a patient from the patient list or after registering a new patient.
⚠ The time has been set to default. Please set the time.	• Clock error The time setting may have become incorrect due to a battery shortage after an extended period of nonuse (about a month), or the circuit board or the time IC on the circuit board may have failed. Correct the time setting. (See “○ Date and Time” (page 136).) • If the same message appears after correcting the time setting, turn off the device power and contact NIDEK or your authorized distributor.
⚠ Unable to connect to NAVIS-EX.	• The device cannot connect to the NAVIS-EX database (PC). • Check the LAN setting or the connection of the communication cable. Check also whether the parameters for communication are set correctly. Entrust the connection to service personnel of NIDEK or your authorized distributor. (See “○ Transfer” (page 121) and “3.2.1 Network connection (LAN)” (page 144).)
⚠ The server has exceeded the maximum number of allowed connections.	• The device cannot connect to the NAVIS-EX database (PC) due to the limit of connectable devices. • Contact NIDEK or your authorized distributor.
⚠ The destination folder for saving NAVIS-EX data is not found.	• The destination folder for saving NAVIS-EX data cannot be not found in the connection check. • Check the LAN connection setting. (See “○ Transfer” (page 121).)
⚠ Unable to access to the database.	• The device cannot connect to a database (PC) other than NAVIS-EX. • Check the LAN setting or the connection of the communication cable. Check also whether the parameters for communication are set correctly. Entrust the connection to service personnel of NIDEK or your authorized distributor. (See “○ Transfer” (page 121) and “3.2.1 Network connection (LAN)” (page 144).)
⚠ There are some images that could not be retrieved. The patient data may already have been deleted or not been able to be obtained from the database.	• Retrieval of images temporarily saved in the device was attempted immediately after starting up the device that is used in connection with the NAVIS-EX database (PC). However, the retrieval failed because the patient information was not in the device. • Check the patient information in NAVIS-EX.
⚠ Unable to register the patient data.	• Registration of patient data failed. • Try registering the patient data again.
⚠ Unable to transfer the images. Please check the connection settings and be sure they are connected properly.	• Transfer of images to an external device failed. • Check the connection to the destination external device. (See “○ Transfer” (page 121), “3.1.1 Connection, disconnection, and use of USB flash drive” (page 140), and “3.2.1 Network connection (LAN)” (page 144).)

Message	Cause and remedy
⚠ The printer has exceeded the maximum number of allowed simultaneous print jobs. Please wait until other print jobs are finished.	• Although printing of multiple sheets was interrupted due to a problem in the printer (such as shortage of printer paper or ink, or paper jamming), there are more than five unprinted images. Only a maximum of five images can be in the printing queue. After remedying the problem of the printer, five images in the printing queue are printed, but printing of the 6th and the subsequent images in the printing queue is cancelled. • It is recommended that the number of sheets to be printed at the same time be limited to five.
⚠ Unable to print. Please check the printer connection and be sure it is connected properly.	• Printing failed even though captured images were saved with the "Auto Print" setting set to ON. • Check the printer power supply, printer paper, printer ink, and connection with the device. • For details of the Auto print setting, see "○ External settings and Other settings" (page 121) in "2.9.3 External settings and Other settings" (page 121).
⚠ Please select two or more fixation lamps.	• Setting of the fixation lamps in Panorama photography mode was 0 or 1. In Panorama photography mode, two to nine fixation lamps need to be selected. (See "○ Pan. fixation lamps" (page 116).)
⚠ Patient ID cannot be set to hide.	• Patient ID was not selected for items to be displayed in the patient list. Patient ID needs to be selected. (See "○ Patient list" (page 109).)
⚠ There are some patient data (CSV) that could not be registered.	• Patient data registration using a CSV file failed. • Check the content of the CSV file. • When the NIDEK's image filing software NAVIS-EX is used, patient data that is being selected on the NAVIS-EX software or in the Recycle Bin of NAVIS-EX cannot be registered using the CSV file.
⚠ Patient data in the Recycle Bin of NAVIS-EX cannot be operated.	• Operation was attempted for the patient data in the Recycle Bin of NAVIS-EX. • Delete the patient data from the Recycle Bin or restore the patient data to the patient list.
⚠ Unable to save data to the USB flash drive. Check the USB flash drive.	・At the time of disconnection from NAVIS-EX, saving of image data that was being captured to the USB flash drive failed. ・Check the connection of the USB flash drive.
⚠ The file cannot be transferred because a file with the same name as 1) image exists in the destination folder. Check the output file name or the contents of the destination folder.	・A file with the same file name exists in the transfer destination folder. "1)" in the message indicates the index of the image. ・Check the setting of the output file name or the contents of the destination folder.
⚠ The file cannot be transferred because a file with the same name as 1) image exists in the backup folder. Check the output file name or the contents of the backup folder.	・A file with the same file name exists in the backup folder. "1)" in the message indicates the index of the image. ・Check the setting of the output file name or the contents of the backup folder.
⚠ Any other location than the USB flash drive cannot be referred to.	・Display of a place other than the USB flash drive was attempted in the "Check USB flash drive contents" window that appears by pressing the Check contents button in the USB Flash Drive Settings dialog.

Message	Cause and remedy
⚠ Data transfer was interrupted due to failure to transfer images neither to LAN nor to USB. Check the transfer environment. LAN transfer: Transferred (## / $$) USB transfer: Transferred (## / $$)	・There are images that failed to be transfered both in LAN transfer and USB backup transfer. About the number of images (## / $$) in the message ##: Number of images successfully transferred $$: Number of total images to be transferred ・Check the environment for transfer.
⚠ Neither C nor D drive can be specified as the watched folder.	・Although the watched folder was changed in the Patient entry (CVS) screen, the specified folder was the C or D drive. ・Check the setting of the watched folder.
⚠ Moving of the file failed.	・An attempt to move the file in the watched folder when the Patient entry (CVS) screen was being closed failed. ・Check the setting of the watched folder.

4.3 Cleaning Objective Lens

Clean the objective lens if it is dirty from contact with eyelashes, teardrops, fingerprints, or other causes.
Even slight dust or fingerprints may deteriorate the captured image. It is recommended to check the objective lens each time before using the camera and clean it if necessary.

○ Check whether the cleaning objective lens is clean with the procedure below.

1 Pull the infrared filter lever to remove the infrared filter inside the device so that visible light is emitted.

A message “Would you like to clean the objective lens?” appears.

2 Press “YES”.

A message “Please set the Observation Illumination to Min.” appears.

3 Set the observation light intensity to the minimum.

4 Press “OK”.

A message “Please clean the objective lens while adjusting the light intensity. Please place the infrared filter back after cleaning the objective lens.” appears.

5 Clean the objective lens in the method below in accordance with the message.

Cleanliness of the objective lens can be observed clearly by looking at the objective lens at an angle while gradually increasing the observation light intensity from the minimum using the observation illumination intensity knob.

1) Remove the dust settled on the surface of the objective lens.

 Blow the dust off the lens with a blower.

2) If the surface of the objective lens is contaminated, gently wipe the lens with a clean swab or the equivalent dampened with a little amount of alcohol (absolute alcohol).

 Starting from the center of the lens, gently wipe the lens by moving the swab outward in a spiral.

 If the lens is still contaminated, use a new swab and repeat the above process until the lens is clean.

3) When the cleaning is finished, push the infrared filter lever into the device.

 The cleaning is complete.

⚠CAUTION • **Do not wipe the objective lens forcibly or when dust is present.**
The lens surface may be scratched.

4.4 Attaching Chinrest Paper

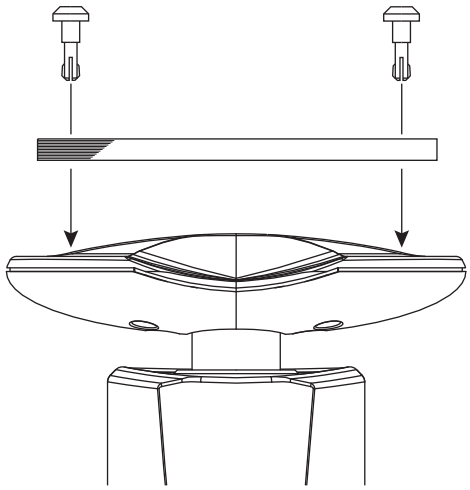
1 Extract the two pins from the chinrest.

2 Take an appropriate amount of the chinrest paper from the pack.

The whole stack of chinrest papers cannot be set at once. Remove less than 6 mm thick chinrest papers. Be careful so that the stack does not become loose.

3 Insert the two pins into the holes of the chinrest paper.

Insert the pins into both holes on the chinrest paper.



4 Attach the chinrest paper to the chinrest.

1) While holding the sheets of chinrest paper and the two pins together, insert a pin into one of the holes of the chinrest.
2) Insert the other pin into the other hole of the chinrest.

4.5 Cleaning Exterior

If the exterior of the device and the LCD touch-screen are contaminated, blow dust off them, then wipe them with a dry clean cloth.
For stubborn contamination, soak a cloth in a detergent diluted with water, wring it, and wipe the contaminated part. After that wipe them with a dry soft cloth.

⚠CAUTION
- **Do not use organic solvents such as thinner or cleaners containing abrasives.**
 The surface or paint of the housing may be damaged.
- **Do not press the LCD touch-screen with force or place a magnetic object near it.**
 The LCD touch-screen may be damaged or fail.

4.6 Consumables and Maintenance Parts List

Part name	Part number	Remarks
Chinrest paper	32903-M407	1 stack

○ Parts to be maintained by service personnel

Part name	Part number	Remarks
Halogen lamp	15456-0500	1 set
Xenon flash lamp	15456-0600	1 set

Halogen lamp

The service life of the halogen lamp is about 1,000 hours when it is continuously lit with the maximum intensity.
The intensity of the halogen lamp is automatically reduced to an appropriate level except while displaying the fundus observation image. After image capture, switch to the anterior eye observation screen instead of leaving the device displaying the fundus observation screen to extend the lamp's service life.

Xenon flash lamp

The service life of the xenon flash lamp is 15,000 times of emission with the maximum intensity use condition (FL 17 in Small pupil photography mode).
The lower the intensity is, the longer the service life become. If images are captured only with the standard FL 9, the service life may become 10 times or more longer than the above.

* When the lamp is replaced with a spare, restock the spare.

5. SPECIFICATIONS AND ACCESSORIES

5.1 Classifications

[Form of protection against electrical shock] Class I

The AFC-330 is classified as a Class I device. A Class I device is a device in which protection against electric shock does not rely on basic insulation only, but which includes additional safety precaution in such a way that means are provided for the connection of accessible conductive parts to the protective ground conductor in the fixed wiring of the installation so that they cannot become live in the event of a failure of the basic insulation.

[Compliance with Electromagnetic Compatibility Directive]

The AFC-330 complies with the EMC standard, IEC 60601-1-2: 2007

[Degree of protection against harmful ingress of water or particulate matter] IPX0[*1]

The AFC-330 provides no protection against ingress of water or particulate matter with harmful effects. Avoid splashing water or other liquids on or near the device.

[Degree of suitability for use in an oxygen rich environment]

The AFC-330 is not intended for use in an oxygen rich environment.

[Method(s) of sterilization recommended by the manufacturer]

The AFC-330 does not have any part to be sterilized.

[Mode of operation]

The AFC-330 is classified as a continuous operating device.

[Mode of transport]

The AFC-330 is classified as a stationary device.

***1. In accordance with IEC 60529**

Note

- Composition (material) of parts of the device that come into contact with the patient or the operator during image capture is as follows:
 - Operation panel (Anterior eye/fundus observation toggle button, focus knob, chinrest up/down buttons, observation illumination knob): ABS resin
 - Release button: ABS resin
 - Joystick: ABS resin, synthetic rubber, polycarbonate
 - LCD panel: ABS resin
 - LCD touch-screen: Polyethylene terephthalate
 - Locking knob: Aluminum
 - Power switch: Polyamide resin
 - Forehead rest: Aluminum, elastomer
 - Chinrest: ABS resin
 - Compensation lens select lever: Polyacetal
 - Infrared filter lever: Polyacetal
 - Spacer for anterior eye image capture: ABS resin

5.2 Specifications

○ Device specifications

- Type: Non-mydriatic fundus camera
- Angle of view: 45º (33º in Small pupil photography mode)
- Magnification: 0.42x
- Resolution: 60 line pairs/mm or more in the central area
 40 line pairs/mm or more in the middle area
 25 line pairs/mm or more in the peripheral area
- Dot pitch on fundus: 4.4 µm
- Working distance: 45.7 mm (from the objective lens to the cornea)
- Working distance detection method (anterior eye)
 Working distance indicator
- Minimum required pupil diameter
 4 mm in diameter (In Small pupil photography mode: 3.3 mm in diameter)
- Image display: 8.4-inch color LCD touch-screen
- Dioptric compensation for patient's eye
 −33 to +35 D in total
 −33 to −7 D with minus compensation lens
 −12 to +15 D with no compensation lens
 +11 to +35 D with plus compensation lens
- Focusing method (fundus)
 Infrared focus split alignment
 Adjustable range: -12 to +15 D
- Auto focus range (fundus)
 −12 to +15 D
- Light source: For observation—Halogen lamp 12 V 50 W
 For capturing—Xenon flash lamp 300 W·s
- Flash intensity adjustable range
 17 levels from FL1 (F4.0 +0.8 EV) to FL17 (F16 +0.8 EV)
- Flash intensity adjustment increments
 0.5 EV
- Internal fixation lamp
 LED (A maximum of 9 points can be selected out of 12 points in total)
 (Selectable patterns) Standard (3 points) / Advanced (7 points) / Panorama (2 to 9 points)
- Vertical movement range
 32 mm
- Horizontal movement range
 Forward and backward: 40 mm, Left and right: 85 mm
- Auto tracking range: ±16 mm up and down
 ±5 mm right and left
 ±5 mm forward and backward
- Chinrest movement range
 62 mm vertically (motorized)
- Interface: USB 2.0
 LAN (Ethernet)

○ Power specifications

- Power source AC 100 to 240 V 50/60 Hz
- Power consumption 150 VA

○ Dimensions and mass

- Dimensions 316 mm (W) × 518 mm (D) × 579 mm (H)
- Mass 29 kg

○ Environmental conditions

- Installation location Indoors
- Temperature 10 to 35ºC (50 to 95ºF) (during use)
 -30 to 60ºC (-22 to 140ºF) (during transport)
 -10 to 55ºC (14 to 131ºF) (during storage)
- Humidity 30 to 90% (Non-condensing) (during use)
 10 to 95% (during transport and storage)
- Atmospheric pressure
 800 to 1,060 hPa (during use)
 700 to 1,060 hPa (during transport and storage)
- Others Free from harmful dust or smoke

○ Others

- Expected service life (defined by manufacturer)
 8 years from the date of initial operation
 * Proper maintenance, inspection and consumable parts replacement are necessary.
- Number of units per package
 1 unit

5.3 Configuration

5.3.1 Standard Configuration

- Fundus camera 1 unit
- Power cord. 1 unit
- Dust cover 1 unit
- Chinrest paper 1 unit
- Chinrest paper pins 2 units
- Objective lens cap 1 unit
- Cap holder 1 unit
- Spacer for anterior eye image capture. . 1 unit
- Blower 1 unit
- NAVIS-EX license 4 licenses
- Operator’s manual 1 volume
- Quick reference guide 1 volume

5.3.2 Optional accessories

- External fixation lamp unit
- Image filing software NAVIS-EX (Version 1.3.4 or later)
- USB extension cable

6. EMC (ELECTROMAGNETIC COMPATIBILITY)

6.1 EMC (Electromagnetic Compatibility)

The device complies with the International Electrotechnical Commission standards (IEC 60601-1-2: 2007) for electromagnetic compatibility.

⚠ WARNING

- Use the specified accessories, optional accessories, and cables.
 Otherwise increased emissions or decreased immunity of the device may result.
- Do not use the device near, on, or under other electronic equipment.

⚠ CAUTION

- The device needs special precautions regarding EMC.
 The device needs to be installed and used in accordance with the EMC information provided in this manual.
- Portable and mobile RF communications equipment can affect the device.

O Specified cable

Part name	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
Power cable	-	No	No	2.5
LAN cable	Yes	Yes	Yes	5.0
external fixation lamp	No	Yes	No	0.35
USB extension cable	Yes	Yes	No	0.10

O Essential performance

Fundus image capture function

Guidance and manufacturer's declaration - electromagnetic emissions		
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	*1	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	*2	

* 1 For the regions where the rated voltage is 220 V or greater, this device complies with class A. For the regions where the rated voltage is 127 V or less, this standard is not applicable.

* 2 For the regions where the rated voltage is 220 V or greater, this device complies with this standard. For the regions where the rated voltage is 127 V or less, this standard is not applicable.

Guidance and manufacturer's declaration - electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic Discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage, dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (> 95% dip in U_T) for 5 sec	<5% U_T (> 95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (> 95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.
Power frequency (50/ 60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms (V_1=3)	Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d=1.2\sqrt{P}$ 150 kHz to 80 MHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m (E_1=3)	$d=1.2\sqrt{P}$ 80 MHz to 800 MHz $d=2.3\sqrt{P}$ 800 MHz to 2.5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the device			
The device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter (W)	**Separation distance according to frequency of transmitter (m)**		
	150 kHz to 80 MHz **$d=1.2\sqrt{P}$**	**80 MHz to 800 MHz** **$d=1.2\sqrt{P}$**	**800 MHz to 2.5 GHz** **$d=2.3\sqrt{P}$**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

7. GLOSSARY

To assist in use of this manual, the following glossary is provided. Familiarize yourself with the definitions of these words.

●Alignment

Indicates moving the image capturing unit to the optimum position for image capture. The alignment is performed twice: one in the anterior eye observation screen and the other in the fundus observation screen.

Anterior eye observation screen: Rough alignment is performed using the electronic working dot and the working distance indicator.

Fundus observation screen: Fine adjustment is performed using the electronic working dot and the optical working dot.

●Auto focus

Adjusts the focus automatically on the fundus when the anterior eye observation screen is changed to the fundus observation screen.

●Auto shot

The auto shot is used to perform the sequence of the automatic alignment, auto focus, and fundus image capture almost automatically only by performing an approximate alignment to the anterior eye of the patient. The auto shot enables easy fundus image capture by inexperienced operators.

There are two auto shot types: “With the blink detector” and “Without the blink detector”

When using the auto shot with the blink detector, automatic image capture is started after the auto tracking and auto focus are completed and the patient’s blink is detected.

When using the auto shot without the blink detector, automatic image capture is started immediately after the auto tracking and auto focus are completed.

Depending on the condition of the patient’s eye, automatic image capture may be disabled or captured images may become obscured by blinking.

●Auto tracking function

Adjusts the up, down, left, right, forward, and backward positions of the image capturing unit automatically to the patient’s eye by detecting eight cornea-reflected spots of infrared LEDs.

●Electronic working dot

Used to perform alignment to the anterior eye and fundus.

It is an illumination spot displayed in the center of the eight infrared LEDs reflected from the cornea when they are detected. When they are adjusted to the center of the target mark, the image capturing unit is in the optimum position both vertically and horizontally for image capture in the anterior eye or fundus observation screen.

●Expected service life

A period of time beyond which the reliability and safety of the system cannot be guaranteed even with normal use and regular maintenance that involves proper exchange of maintenance and consumable parts, repair, and overhaul.

●Low-light photography mode

In Low-light photography mode, the automatic ISO speed adjustment allows capturing of images of the usual brightness with lower flash intensity than usual. It is useful for patients whose iris easily contracts.

●Optical working dots

Used to perform manual alignment to the fundus.

They are two illumination spots of infrared LEDs reflected from the cornea that are displayed on the left and right sides in the fundus observation screen. When they are adjusted on the optical working dot charts and can be seen clearly, the image capturing unit is in the optimum position for image capture.

●Panorama photography mode

Used to capture panoramic funds images. The desired two to nine images can be captured and arranged as a composite panoramic image using NIDEK image filing software, NAVIS-EX.

●Required pupil diameter

Indicates the minimum pupil diameter required for proper image capture. The required pupil diameter for this device is 4 mm in diameter. The device is equipped with the function to judge automatically if the patient’s pupil is larger or smaller than the required pupil diameter.

●Small pupil photography mode

Used for image capture of eyes whose pupil diameter is smaller than the requirement but larger than 3.3 mm in diameter. In this mode, a little amount of flare may be captured on the peripheral area.

●Stereo photography mode

Used to capture two fundus images: one at about 1 mm away to the temporal side from the fundus center, and the other at about 1 mm away to the nasal side from the fundus center.

The two captured images can be viewed stereoscopically using the stereo viewer on the image filing software NAVIS-EX.

●Working distance

Indicates the distance between the objective lens and the corneal surface at the optimum position for fundus image capture.